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ABSTRACT

This is a teacher's guide to secondary school mathematics. Developed for use in the Duval County Public Schools, Jacksonville, Florida. Areas of mathematics covered are algebra, analysis, calculus, computer literacy, computer science, geometry, analytic geometry, general mathematics, consumer mathematics, pre-algebra, probability and statistics, and trigonometry. Courses in each of these areas are offered to students according to grade and aptitude level. The curriculums range from grade 8-12. For each course, an introduction, a course outline, a list of performance objectives, and a key to recommended instructional materials are provided. (CMG)

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1982

TEACHER'S GUIDE TO SECONDARY MATHEMATICS

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INTRODUCTION

ALGEBRA I

State Accreditator Number. . 2215
Course Code Number 1604
F.T.E. Category. 1.10
Instructional Level. . . . . Standard

Report Card Abbreviation . . ALG 1
Length of Course . . . . . . Year
Credit . . . . 1 Math Credit
Grade Level. 9, 10, 11, 12

Prerequisites

Math Teacher Recommendation/Mastery of Basic Skills/A-B Average in Previous Standard Math Course

Textbook(s)

Dolciani, Mary P., et al, Algebra: Structure and Method Book 1 (Boston: Houghton Mifflin Company, 1979).

Supplementary Materials

Dolciani, Mary P., et al, Duplicating Masters Algebra: Structure and Method Book 1 (Boston: Houghton Mifflin Company, 1976).

Dressler, Isidore, Algebra 1: Review Guide (New York: Amsco School Publications, Inc., 1966).

Marcy, Janis and Steve Marcy, Pre Algebra with Pizzazz (Palo Alto, California: Creative Publications, Inc., 1978).

Rich, Barnett, Schaum's Principles and Problems of Elementary Algebra (New York: McGraw-Hill Book Company, 1960).

Notes to Teachers

Students will master the concepts and skills developed for Algebra I as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

ALGEBRA I

- 1.0 Variable Expressions and Open Sentences
  - 1.1 Simplify Numerical Expressions
    - 1.1.1 Grouping symbols
    - 1.1.2 Order of operations
  - # *1.2 Evaluate Variable Expressions
  - # 1.3 Exponents
    - 1.3.1 Write expressions
    - 1.3.2 Evaluate expressions
  - 1.4 Determine Solution Sets Given Domains
    - 1.4.1 Equations
    - 1.4.2 Inequalities
  - # *1.5 Translate to Mathematical Symbols
    - 1.5.1 Word phrases
    - 1.5.2 Word sentences

- 2.0 Operations on Rational Numbers
  - 2.1 The Number Line
    - 2.1.1 State coordinates
    - 2.1.2 Graph numbers
    - 2.1.3 Compare numbers
    - # 2.1.4 Add integers
    - 2.1.5 Additive inverses
    - 2.1.6 Absolute value
  - # *2.2 Add Signed Numbers
  - *2.3 Subtract Signed Numbers
    - 2.3.1 Express differences as sums
    - 2.3.2 Compute
  - # *2.4 Multiply Signed Numbers
  - 2.5 Determine Reciprocals
  - *2.6 Divide Signed Numbers
    - 2.6.1 Express quotients as products
    - 2.6.2 Compute

- 3.0 Properties of Real Numbers
  - # 3.1 Justify Algebraic Statements
  - # 3.2 Simplify Numerical Expressions
  - 3.3 Combine Similar Terms

- 4.0 Linear Equations, One Variable
  - # *4.1 Solve (Variable in One Member)
    - 4.1.1 Addition Property of Equality
    - 4.1.2 Multiplication Property of Equality
    - 4.1.3 Addition & multiplication combined
  - # *4.2 Solve (Variable in Both Members)
  - # 4.3 Solve Word Problems
    - 4.3.1 Number
    - 4.3.2 Consecutive integer
    - 4.3.3 Age
    - 4.3.4 Perimeter
    - 4.3.5 Coin
    - 4.3.6 Uniform motion

- 5.0 Polynomials
  - *5.1 Add and Subtract Polynomials
  - *5.2 Multiply Polynomials
    - 5.2.1 Products of monomials
    - 5.2.2 Powers of monomials
    - 5.2.3 Products of monomials and polynomials
    - 5.2.4 Products of polynomials
    - 5.2.5 Powers of binomials
  - # 5.3 Divide Polynomials
    - 5.3.1 Monomial by monomial
    - 5.3.2 Polynomial by a monomial
  - # 5.4 Prime Numbers
    - 5.4.1 Identify prime numbers
    - 5.4.2 Prime factorizations
  - *5.5 Factor Polynomials
    - 5.5.1 Greatest monomial factor
    - 5.5.2 Differences of squares
    - 5.5.3 Trinomial squares
    - 5.5.4 Trinomials, not squares
    - 5.5.5 Grouping
    - 5.5.6 Combined methods

* Indicates Minimum Level Skills
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

ALGEBRA I

- 5.6 Solve Equations by Factoring

- 6.0 Rational Expressions
  - 6.1 Simplify Rational Expressions
    - 6.1.1 Factoring
    - 6.1.2 Long division
  - # 6.2 Express Ratios of Two Quantities
  - 6.3 Multiply & Divide Algebraic Expressions
  - # 6.4 Add & Subtract Algebraic Expressions
  - 6.5 Simplify Complex Fractions
  - 6.6 Solve Fractional Equations
  - #δ 6.7 Solve Word Problems
    - 6.7.1 Percentage
    - 6.7.2 Mixture
    - 6.7.3 Work

- 7.0 Inequalities
  - 7.1 Order Symbols
  - # 7.2 Number Line Representation
    - 7.2.1 Graph sets
    - 7.2.2 Describe sets
  - 7.3 Linear Inqualities, One Variable
    - 7.3.1 Solution sets
    - 7.3.2 Graphs
  - # 7.4 Sets
    - 7.4.1 Intersections and unions
    - 7.4.2 Venn diagrams
  - 7.5 Solve Compound Inequalities
  - 7.6 Absolute Value

- 8.0 Functions and Relations
  - 8.1 Domain & Range
  - 8.2 Values of Functions
  - 8.3 Coordinate Plane
    - *8.3.1 Write coordinates of points
    - 8.3.2 Plot points
  - 8.4 Recognize Functions
    - 8.4.1 Sets of points
    - 8.4.2 Graphs
  - 8.5 Linear Equations, Two Variables
    - 8.5.1 Write in form $y = mx+b$
    - 8.5.2 Determine three or more solutions
    - 8.5.3 Graph
  - # 8.6 Determine Slope
    - 8.6.1 Two points
    - 8.6.2 Equation of a line
  - 8.7 Graph Lines Using Slope
    - 8.7.1 Slope and point
    - 8.7.2 Slope and y-intercept
  - 8.8 Determine Equations of Lines
    - 8.8.1 Slope and point
    - 8.8.2 Two points
    - 8.8.3 Slope and y-intercept
  - 8.9 Graph Linear Inequalities, Two Variables

- 9.0 Systems of Linear Equations
  - 9.1 Solve Systems
    - 9.1.1 Graph
    - 9.1.2 Substitution
    - 9.1.3 Linear combinations
  - 9.2 Solve Word Problems
    - 9.2.1 Number problems
    - 9.2.2 Perimeter problems
    - 9.2.3 Money (Coin) problems
    - 9.2.4 Digit problems
    - 9.2.5 Age problems
    - 9.2.6 Uniform motion problems

- 10.0 Rational/Irrational Numbers
  - 10.1 Ordering Rational Numbers
    - 10.1.1 Compare with symbols
    - 10.1.2 Arrange in order
  - 10.2 Forms of Rational Numbers
    - 10.2.1 Change fractions to terminating or repeating decimals
    - 10.2.2 Change repeating decimals to fractions

ALGEBRA I

- *10.3 Simplify Square Root Radical Expressions
  - 10.3.1 Perfect squares
  - 10.3.2 Not perfect squares
- 10.4 Perform Basic Operations on Radicals
  - 10.4.1 Add
  - 10.4.2 Subtract
  - 10.4.3 Multiply
  - 10.4.4 Divide
- 10.5 Solve Radical Equations

11.0 Quadratic Equations

- 11.1 Solve by Completing the Square
- 11.2 Solve by Quadratic Formula

PERFORMANCE OBJECTIVES
ALGEBRA I

Algebra I is a course which involves the study of the structure and properties of the system of real numbers. Problem solving techniques for various types of problems are developed, and equations, inequalities, polynomials, and functions are simply, yet thoroughly, treated. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Variable Expressions and Open Sentences

1.1 Students will simplify numerical expressions by using (1) grouping symbols and (2) the order of operations.

#*1.2 Students will evaluate variable expressions.

#1.3 Students will (1) rewrite given expressions using exponential notation and (2) evaluate expressions containing exponents when given values of the variables.

1.4 Students will use substitution to determine the solution sets of (1) equations and (2) inequalities when given specified domains.

#*1.5 Students will translate (1) word phrases into variable expressions and (2) word sentences into equations using appropriate mathematical symbols.

2.0 Operations on Rational Numbers

2.1 Students will use a number line to (1) state the coordinates of specified points, (2) graph points whose coordinates are given, (3) compare numbers, #(4) add integers, (5) determine the additive inverses of given numbers, and (6) determine the absolute values of given numbers.

#*2.2 Students will add signed numbers.

*2.3 Students will subtract signed numbers by (1) expressing differences as sums and (2) computing the sums.

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*Indicates Minimum Level Skills
δIndicates State Student Assessment Program
#Indicates Stanford Achievement Test

# *2.4 Students will multiply signed numbers.

2.5 Students will determine reciprocals of specified rational numbers.

*2.6 Students will divide signed numbers by (1) expressing quotients as products and (2) computing the quotients.

3.0 Properties of Real Numbers

# 3.1 Students will use properties (axioms), definitions, and principles of algebra to justify algebraic statements (Commutative, Associative, Closure, Identity, Inverse, Distributive Properties; Reflexive, Symmetric, Transitive, Additive, Multiplicative, Properties of Equality; Zero and Negative One Multiplication Properties; Definitions of Subtraction and Division, Substitution Principle).

# 3.2 Students will use the commutative, associative, and distributive properties to simplify numerical expressions.

3.3 Students will use the distributive property to combine similar (like) terms.

4.0 Linear Equations in One Variable

# *4.1 Students will solve first degree equations with variables in one member by using the (1) addition, (2) multiplication, and (3) both addition and multiplication properties of equality.

# *4.2 Students will solve first degree equations with variables in both members.

# 4.3 Students will solve word problems including (1) number problems, (2) consecutive integer problems, (3) age problems, (4) perimeter problems, (5) coin problems, and (6) uniform motion problems.

5.0 Polynomials

*5.1 Students will add and subtract polynomials.

*5.2 Students will find (1) products of monomials, (2) powers of monomials, (3) products of monomials and polynomials, (4) products of polynomials, and (5) powers of binomials.

# 5.3 Students will divide (1) monomials by monomials and (2) polynomials by monomials.

# 5.4 Students will (1) identify prime numbers and (2) write prime factorizations.

*5.5 Students will (1) find the greatest monomial factor of given polynomials, (2) factor differences of squares, (3) factor trinomial squares, (4) factor trinomials which are not perfect squares, (5) factor by grouping, and (6) factor by combining several methods.

5.6 Students will solve equations by factoring.

6.0 Rational Algebraic Expressions

6.1 Students will simplify rational expressions by (1) factoring and (2) using long division.

# 6.2 Students will express ratios of two quantities.

6.3 Students will multiply and divide rational expressions.

# 6.4 Students will add and subtract rational expressions.

6.5 Students will simplify complex fractions.

6.6 Students will solve fractional equations.

#δ 6.7 Students will solve word problems including (1) percentage problems, (2) mixture problems, and (3) work problems.

7.0 Inequalities

7.1 Students will use order symbols to compare numbers.

# 7.2 Students will (1) graph sets of points on the number line and (2) describe sets whose graphs are shown.

7.3 Students will (1) determine solution sets and (2) graph solution sets of linear inequalities in one variable.

# 7.4 Students will determine (1) intersections and unions of sets and (2) draw Venn diagrams.

7.5 Students will solve compound inequalities.

7.6 Students will solve inequalities involving absolute value.

8.0 Functions

8.1 Students will state domains and ranges of specified relations.

8.2 Students will determine values of functions.

8.3 Given the coordinate plane, students will:

*(1) write the coordinates of specified points and

(2) plot points whose coordinates are known.

8.4 Students will recognize functions when given (1) sets of points and (2) graphs.

8.5 When given linear equations in two variables, students will (1) write them in $y = mx+b$ form, (2) determine three or more solutions and (3) graph on the coordinate plane.

8.6 Students will determine the slope of a line when given (1) two points on a line and (2) an equation of the line.

8.7 Students will use (1) the slope and a point and (2) the slope and the y-intercept to graph lines.

8.8 Students will determine the equation of a line when given (1) the slope and a point, (2) two points and (3) the slope and the y-intercept.

8.9 Students will graph linear inequalities in two variables.

9.0 Systems of Linear Equations

9.1 Students will solve systems of linear equations by (1) graphing, (2) substitution, and (3) linear combinations.

9.2 Students will solve word problems including (1) number problems, (2) perimeter problems, (3) money problems, (4) digit problems, (5) age problems, and (6) uniform motion problems using systems of linear equations.

10.0 Rational and Irrational Numbers

10.1 Students will (1) use order symbols to compare rational numbers and (2) arrange sets of rational numbers in increasing order.

10.2 Students will (1) change fractions to terminating or repeating decimals and (2) change repeating decimals to fractions.

*10.3 Students will simplify square root radical expressions which are (1) perfect squares and (2) not perfect squares.

10.4 Students will (1) add, (2) subtract, (3) multiply, and (4) divide radicals.

10.5 Students will solve radical equations.

11.0 Quadratic Equations

11.1 Students will solve quadratic equations by completing the square.

11.2 Students will solve quadratic equations using the quadratic formula.

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
ALGEBRA I

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted Algebra 1		Supplementary Instructional Materials		
				Text	DM	Algebra 1 AMSCO	PIZZAZZ	SCHAUM'S
1.0	VARIABLE EXPRESSIONS/ OPEN SENTENCES	2 Weeks						
1.1	Simplify Numerical Expressions			1-3,10-11	1,3	1-3,14-19, 58-59	DD8,9	6-8
1.2	Evaluate Variable Expressions		MLST SAT	4-6	1,3, 4, 15, 48	54-56,143-144	DD11,12,15, 23,24	6-8,14-16,48,49, 52
1.3	Exponents		SAT	7-9	2-4	53-54,56-59	BB8-10	9-11,15,16
1.4	Determine Solution Sets Given Domains			17-19	4	39-45	DD26-28	17,18,31
1.5	Translate to Mathematical Symbols		MLST SAT	20-24	5	19-20,45-52, 80-82	BD39	1,4-6,12-14,18, 19,31

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
ALGEBRA I

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted Algebra 1		Supplementary Instructional Materials		
				Text	DM	Algebra 1 AMSCO	PIZZAZZ	SCHAUM'S
2.0	OPERATIONS ON RATIONAL NUMBERS	2 Weeks			15		AA24,42,49, 52-54, 61-65	
2.1	The Number Line		SAT	31-40	6,7	6-10,37-38, 105-118	AA8-12	36-39
2.2	Add Signed Numbers		MLST SAT	42-45	8	118-127	AA13-17, 35-37	40-42,50
2.3	Subtract Signed Numbers		MLST	52-55	9	133-137	AA19-23,38, 39	42-44,52
2.4	Multiply Signed Numbers		MLST SAT	63-65	10	127-133	AA25-28, 43-45, 55,56	44-46,52
2.5	Determine Reciprocals			70-72	11	139-141	AA46	186-187,196
2.6	Divide Signed Numbers		MLST	78-81	13	137-142	AA29-31,47, 48,59,60	47,48,52

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
ALGEBRA I

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted Algebra 1		Supplementary Instructional Materials		
				Text	DM	Algebra 1 AMSCO	PIZZAZZ	SCHAUM'S
3.0	PROPERTIES OF REAL NUMBERS	2 Weeks						
3.1	Justify Algebraic Statements		SAT	67-69, 88-94	14	60-74		
3.2	Simplify Numerical Expressions		SAT	63-69	11	66,69,72	AA64-67 DD16-19	
3.3	Combine Similar Terms			101-105	16, 17	75-77	DD10,11,13, 14,16-21	11,12,16
4.0	LINEAR EQUATIONS: ONE VARIABLE	5 Weeks						
4.1	Solve, Variable in One Member		MLST SAT	48-51, 56-57, 74-77, 82-87, 104-106	8,9, 12- 15, 17, 23, 26, 29, 48	85-88,90-94, 96-104,175-179, 183-189	DD29-36	19-29,31-35, 71-78,81-84

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KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
ALGEBRA I

Performance Objective		Instructional Implications		Resources				
				County Adopted Algebra 1		Supplementary Instructional Materials		
Number	Topic	Teaching Time	Tested On	Text	DM	Algebra 1 AMSCO	PIZZAZZ	SCHAUM'S
4.2	Solve, Variable in Both Members		MLST SAT	107-109	18, 23, 29, 48, 80	180-186	DD37,38	71-78,82-84
4.3	Solve Word Problems		SAT	110-115	18, 19	88-90,95-96, 99,101-102, 200-255	DD40-45	23,25-27,30, 33-35,130,131, 133-138,143-155, 161-166
5.0	POLYNOMIALS	6 Weeks						
5.1	Add/ Subtract Polynomials		MLST	116-119	20, 48, 80	145-148, 155-162		53-59,66-68
5.2	Multiply Polynomials		MLST	120-130	21-24, 27-29, 48, 80	148-151, 162-168, 263-266, 268-270	BB11, DD22	59-61,68,69, 167-169,171-173, 175,178-182
5.3	Divide Polynomials		SAT	145-147, 151-153	25, 26, 80	151-154, 169-174	BB12,13	62-65,69-70

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
ALGEBRA I

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted Algebra 1		Supplementary Instructional Materials		
				Text	DM	Algebra 1 AMSCO	PIZZAZZ	SCHAUM'S
5.4	Prime Numbers		SAT	139-141	25	259-261		167
5.5	Factor Polynomials		MLST	156-178	25-28, 30-33, 48, 66	261-263, 266-268, 270-275		168,172, 174-183
5,6	Solve Equations by Factoring			180-189	34-36, 66, 80	484-488		
6.0	RATIONAL EXPRESSIONS	4 Weeks						
6.1	Simplify Rational Expressions			197-200	37, 48, 80	276-282		188-189,197
6.2	Express Ratios of Two Quantities		SAT	201-204	38	420-426	BB29	

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KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
ALGEBRA I

Performance Objective		Instructional Implications		Resources				
				County Adopted Algebra 1		Supplementary Instructional Materials		
Number	Topic	Teaching Time	Tested On	Text	DM	Algebra 1 AMSCO	PIZZAZZ	SCHAUM'S
6.3	Multiply/ Divide Algebraic Expressions			205-213	38, 39, 48, 66, 80	283-288		190-191,197-198
6.4	Add/ Subtract Algebraic Expressions		SAT	214-217	40, 48, 66, 80	288-296		191-194,198-200
6.5	Simplify Complex Fractions			218-222	41, 42	296-297		194-195,200
6.6	Solve Fractional Equations			224-227	43, 44, 80	301-306, 308-313		
6.7	Solve Word Problems		SSAP SAT	228-245	45-48	314-332		

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
ALGEBRA I

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted Algebra 1		Supplementary Instructional Materials		
				Text	DM	Algebra 1 AMSCO	PIZZAZZ	SCHAUM'S
7.0	INEQUALITIES	2 Weeks						
7.1	Order Symbols			255-257	49	13		
7.2	Number Line Representation		SAT	258-259	49	37-38	DD46	
7.3	Linear Inequalities, One Variable			261-265	50, 66	191-199, 306-308	DD47-49,51	
7.4	Sets		SAT	270-273	51	35-37	DD50-52	
7.5	Solve Compound Inequalities			274-278	51, 66, 80		DD53	
7.6	Absolute Value			280-281				
8.0	FUNCTIONS AND RELATIONS	3 Weeks						
8.1	Domain/ Range			288-290	52	561-565		
8.2	Values of Functions			291-294	52, 54, 80	364-368, 573-576	DD57-60,62	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
ALGEBRA I

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted Algebra 1		Supplementary Instructional Materials		
				Text	DM	Algebra 1 AMSCO	PIZZAZZ	SCHAUM'S
8.3	Coordinate Plane		MLST	296-300	53	360-364	DD54-56	109-111,120
8.4	Recognize Functions			301-304	53	568-573		
8.5	Linear Equations, Two Variables			306-314	54, 55	368-375	DD63-64	112-115,120-121
8.6	Determine Slope		SAT	315-319	56	375-382		
8.7	Graph Lines Using Slope			320-323	56	383-384		
8.8	Determine Equations of Lines			324-325	56, 57, 80	382-385		
8.9	Graph Linear Inequalities, Two Variables			360-363	65	387-390		
9.0	SYSTEMS OF LINEAR EQUATIONS	3 Weeks						

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
ALGEBRA I

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted Algebra 1		Supplementary Instructional Materials		
				Text	DM	Algebra 1 AMSCO	PIZZAZZ	SCHAUM'S
9.1	Solve Systems			337-342, 346-353	59, 61, 62, 80	391-401	DD65	116-118,122-129
9.2	Solve Word Problems			344-345, 355-359	60-64, 66	401-416		131-132,155
10.0	RATIONAL/ IRRATIONAL NUMBERS	4 Weeks						
10.1	Order Rational Numbers			371-375	67	441-442	BB27,28 CC50	
10.2	Forms of Rational Numbers			378-381	67	443-446	BB17-20	
10.3	Simplify Square Root Radical Expressions		MLST	382-392	68, 80	450-455, 464-470	CC47-49	170,201-204, 208-210,216-218

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
ALGEBRA I

Performance Objective		Instructional Implications		Resources				
				County Adopted Algebra 1		Supplementary Instructional Materials		
Number	Topic	Teaching Time	Tested On	Text	DM	Algebra 1 AMSCO	PIZZAZZ	SCHAUM'S
10.4	Perform Basic Operations on Radicals			398-405	70, 71, 80	470-479		210-214, 218-220
10.5	Solve Radical Equations			406-407	72	480-482		214-215,220
11.0	QUADRATIC EQUATIONS	2 Weeks						
11.1	Solve by Completing the Square			432-437	75, 76	492-496		225-227,232
11.2	Solve by Quadratic Formula			438-441	77	496-500		227-228,233

INTRODUCTION
ALGEBRA II, ADVANCED

State Accreditator Number. .	2216
Course Code Number	1612
F.T.E. Category.	1.10
Instructional Level.	Advanced
Report Card Abbreviation . .	ADV ALG 2
Length of Course	Year
Credit	1 Math Credit
Grade Level.	10, 11, 12

Prerequisites

Math Teacher Recommendation/A-B average in Algebra I and Geometry

Textbook(s)

Dolciani, Mary P., et al, Algebra and Trigonometry: Structure and Method, Book Two (Atlanta: Houghton Mifflin Company, 1979).

Notes to Teachers

Students will master the concepts and skills developed for Algebra II, Advanced as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

ALGEBRA II, ADVANCED

1.0 Real Numbers

- *1.1 Field Properties
    - 1.1.1 Algebraic statements
    - 1.1.2 Algebraic proofs
- *1.2 Simplify Numerical Expressions
    - 1.2.1 Order of operations
    - 1.2.2 Absolute value expressions
- 1.3 Prove Theorems

2.0 Open Sentences in One Variable

- *2.1 Determine Solution Sets
    - 2.1.1 First degree equations
    - 2.1.2 First degree inequalities
    - 2.1.3 Absolute value open sentences
- *2.2 Graph Solution Sets
    - 2.2.1 First degree inequalities
    - 2.2.2 Absolute value open sentences
- 2.3 Solve Word Problems
    - *2.3.1 First degree equations
    - 2.3.2 First degree inequalities

3.0 Functions & Relations

- *3.1 State Domain and Range
    - 3.1.1 Ordered pairs
    - 3.1.2 Mapping diagrams
    - 3.1.3 Rules
- *3.2 Identify Functions
    - 3.2.1 Ordered pairs
    - 3.2.2 Mapping diagrams
    - 3.2.3 Graphs
- *3.3 Determine Values
    - 3.3.1 Simple functions
    - 3.3.2 Composite functions
- *3.4 Graph on Coordinate Plane
    - 3.4.1 Functions with specified domains
    - 3.4.2 Linear equations
    - 3.4.3 Linear inequalities

4.0 Slope & Equations of Lines

- *4.1 Determine Slope
    - 4.1.1 Two points
    - 4.1.2 Equations
- *4.2 Determine x- and y-intercepts
- *4.3 Determine Linear Equations
    - 4.3.1 Slope and a point
    - 4.3.2 Two points
    - 4.3.3 Slope and y-intercept
    - 4.3.4 Other pertinent data
- *4.4 Direct Variation
    - 4.4.1 Proportions
    - 4.4.2 Word problems

5.0 Systems of Linear Equations & Inequalities

- 5.1 Apply Slope and y-intercept
    - 5.1.1 Intersecting lines
    - 5.1.2 Parallel lines
    - 5.1.3 Coincident lines
- *5.2 Solve Systems of Equations
    - 5.2.1 Graph
    - 5.2.2 Substitution
    - 5.2.3 Linear combination
    - 5.2.4 Cramer's Rule
- *5.3 Solve Word Problems
- 5.4 Indicate Solution Sets of Inequalities

6.0 Polynomials & Rational Expressions

- *6.1 Use Laws of Exponents
    - 6.1.1 Simplify expressions
    - 6.1.2 Products of monomials
    - 6.1.3 Quotients of monomials
- *6.2 Operations with Polynomials
    - 6.2.1 Add
    - 6.2.2 Subtract
    - 6.2.3 Multiply
    - 6.2.4 Divide

*Indicates Minimum Level Skills

ALGEBRA II, ADVANCED

- 6.3 Factor Polynomials
- *6.4 Identify Solution Sets by Factoring
  - 6.4.1 Quadratic equations
  - 6.4.2 Quadratic inequalities
- *6.5 Operations with Rational Expressions
  - 6.5.1 Add
  - 6.5.2 Subtract
  - 6.5.3 Multiply
  - 6.5.4 Divide
- *6.6 Fractional Equations
  - 6.6.1 Determine solution sets
  - 6.6.2 Solve word problems

7.0 Radicals

- *7.1 Simplify Radical Expressions
- *7.2 Operations With Radicals
  - 7.2.1 Add
  - 7.2.2 Subtract
  - 7.2.3 Multiply
  - 7.2.4 Divide
- *7.3 Solve Radical Equations

8.0 Imaginary & Complex Numbers

- *8.1 Simplify Expressions
- *8.2 Operatons With Complex Numbers
  - 8.2.1 Add
  - 8.2.2 Subtract
  - 8.2.3 Multiply
  - 8.2.4 Divide

9.0 Quadratic Equations

- *9.1 Determine Solution Sets
  - 9.1.1 Completing the square
  - 9.1.2 Quadratic formula
- *9.2 Determine Nature of Roots
- *9.3 Determine Equations From Roots
- *9.4 Solve Word Problems

10.0 Polynomial Functions

- *10.1 Use Synthetic Substitution or Division
  - 10.1.1 Values of polynomial functions
  - 10.1.2 Remainder Theorem
  - 10.1.3 Factor Theorem
- 10.2 Determine Roots
  - 10.2.1 Rational Root Theorem
  - 10.2.2 Fundamental Theorem of Algebra

11.0 Quadratic Relations

- *11.1 Find Distances Between Points
- *11.2 Circles
  - 11.2.1 Equations
  - 11.2.2 Graphs
  - 11.2.3 Characteristics
- *11.3 Parabolas
  - 11.3.1 Equations
  - 11.3.2 Graphs
  - 11.3.3 Characteristics
- 11.4 Ellipses
  - *11.4.1 Equations
  - *11.4.2 Graphs
  - 11.4.3 Characteristics
- 11.5 Hyperbolas
  - *11.5.1 Equations
  - *11.5.2 Graphs
  - 11.5.3 Characteristics
- 11.6 Inverse and Joint Variation
- *11.7 Systems of Quadratic Equations
  - 11.7.1 Solve linear-quadratic
  - 11.7.2 Solve quadratic-quadratic
- 11.8 Solve Word Problems

ALGEBRA II, ADVANCED

- 12.0 Exponential and Logarithmic Functions
  - 12.1 Evaluate Exponential Expressions
    - 12.1.1 Rational
    - 12.1.2 Irrational
  - 12.2 Exponential Equations
    - 12.2.1 Solve equations
    - 12.2.2 Express in logarithmic form
    - 12.2.3 Graph
  - 12.3 Logarithmic Equations
    - 12.3.1 Express in exponential form
    - 12.3.2 Solve equations
    - 12.3.3 Graph
  - 12.4 Compute With Common Logarithms

- 13.0 Sequences and Series
  - 13.1 Recognize Sequences and Series
    - 13.1.1 Arithmetic
    - 13.1.2 Geometric
    - 13.1.3 Neither
  - 13.2 Find nth term
    - 13.2.1 Arithmetic
    - 13.2.2 Geometric
  - 13.3 Find Means of Sequences
    - 13.3.1 Arithmetic
    - 13.3.2 Geometric
  - 13.4 Find Sums of Series
    - 13.4.1 Arithmetic
    - 13.4.2 Geometric
    - 13.4.3 Infinite

- 14.0 Binomial Expansion
  - 14.1 Expand Using Binomial Theorem
  - 14.2 Expand Using Pascal's Triangle
  - 14.3 Find Specified Terms

PERFORMANCE OBJECTIVES
ALGEBRA II, ADVANCED

Algebra II, Advanced is a course which involves a more intensive study of the structures and concepts developed in Algebra II, Standard. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Real Numbers

*1.1 To demonstrate knowledge of field properties, students will (1) justify algebraic statements and (2) provide reasons for steps in algebraic proofs.

*1.2 Students will simplify numerical expressions using the concepts of (1) order of operations and (2) absolute value.

1.3 Students will prove specified algebraic theorems.

2.0 Open Sentences in One Variable

*2.1 Students will determine solution sets for (1) first degree equations, (2) first degree inequalities, and (3) absolute value open sentences.

*2.2 Students will graph solution sets for (1) first degree inequalities and (2) absolute value open sentences.

2.3 Students will solve word problems involving:

*(1) first degree equations and

(2) first degree inequalities.

3.0 Functions and Relations

*3.1 Students will state the domain and range when given (1) ordered pairs, (2) mapping diagrams, and (3) rules for relations.

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*Indicates Minimum Level Skills

*3.2 Students will identify functions when given (1) ordered pairs, (2) mapping diagrams, and (3) graphs of relations.

*3.3 Students will determine values of (1) simple and (2) composite functions.

*3.4 Students will graph (1) functions with specified domains, (2) linear equations, and (3) linear inequalities on the coordinate plane.

4.0 Slope and Equations of Lines

*4.1 Students will determine the slope of a line given (1) two points on the line and (2) the equation of the line.

*4.2 Students will determine the x- and y-intercepts of a line given the equation of the line.

*4.3 Students will determine an equation of the line in the form $Ax + By = C$ when given:

(1) the slope and a point on the line,

(2) two points on the line.

(3) the slope and y-intercept of the line, and

(4) other pertinent data.

*4.4 Students will apply the concept of direct variation to solve (1) proportions and (2) word problems involving proportions.

5.0 Inequalities and Systems of Linear Equations

5.1 Students will apply the concepts of slope and y-intercept to determine (1) intersecting lines, (2) parallel lines, and coincident lines.

*5.2 Students will solve systems of linear equations in two or three variables by (1) graphing, (2) substitution, (3) linear combination, and (4) Cramer's Rule.

*5.3 Students will solve word problems involving systems of linear equations.

5.4 Students will indicate solution sets of systems of linear inequalities by graphing the inequalities and shading the intersection.

6.0 Polynomials and Rational Expressions

*6.1 Students will use the laws of exponents to simplify (1) expressions, (2) products of monomials, and (3) quotients of monomials.

*6.2 Students will (1) add, (2) subtract, (3) multiply, and (4) divide polynomial expressions, writing the results in simplified form.

6.3 Students will factor specified polynomials.

*6.4 Students will identify the solution sets of (1) quadratic equations and (2) quadratic inequalities by factoring the sentences.

*6.5 Students will (1) add, (2) subtract, (3) multiply, and (4) divide rational expressions, writing the results in simplified form.

*6.6 Students will (1) determine solution sets of fractional equations and (2) solve word problems involving fractional equations.

7.0 Radicals

*7.1 Students will simplify radical expressions using the properties of radicals.

*7.2 Students will (1) add, (2) subtract, (3) multiply, and (4) divide radical expressions, writing the results in simplified form.

*7.3 Students will solve specified equations containing radicals.

8.0 Imaginary and Complex Numbers

*8.1 Students will simplify expressions containing square root radicals whose radicands are negative numbers.

*8.2 Students will (1) add, (2) subtract, (3) multiply, and (4) divide complex numbers, writing the results in simplified form.

9.0 Quadratic Equations

*9.1 Students will determine solution sets of quadratic equations by (1) completing the square and (2) using the quadratic formula.

*9.2 Students will determine the nature of the roots of quadratic equations using the discriminant.

*9.3 Students will determine a quadratic equation in the form $ax^2 + bx + c = 0$ when given the roots of the equation.

*9.4 Students will solve word problems involving quadratic equations.

10.0 Polynomial Functions

*10.1 Students will use synthetic substitution or division to (1) determine values of polynomial functions, (2) find quotients and remainders of polynomials, and (3) determine if binomials are factors.

10.2 Students will determine the roots of polynomial equations using (1) the Rational Root Theorem and (2) the Fundamental Theorem of Algebra.

11.0 Quadratic Relations

*11.1 Students will find distances between points using the distance formula.

*11.2 Given appropriate information, students will (1) write equations, (2) graph, and (3) state characteristics for circles.

*11.3 Given appropriate information, students will (1) write equations, (2) graph, and (3) state characteristics for parabolas.

11.4 Given appropriate information, students will:

*(1) write equations,

*(2) graph, and

(3) state characteristics for ellipses.

11.5 Given appropriate information, students will:

*(1) write equations,

*(2) graph, and

(3) state characteristics for hyperbolas.

11.6 Students will solve problems involving inverse and joint variation.

*11.7 Students will solve specified systems of (1) linear-quadratic and (2) quadratic-quadratic equations.

11.8 Students will solve word problems involving linear-quadratic and quadratic-quadratic systems.

12.0 Exponential and Logarithmic Functions

12.1 Students will evaluate exponential expressions involving (1) rational and (2) irrational exponents.

12.2 Students will (1) express exponential equations in logarithmic form, (2) solve exponential equations, and (3) graph exponential equations.

12.3 Students will (1) express logarithmic equations in exponential form, (2) solve logarithmic equations, and (3) graph logarithmic equations.

12.4 Students will compute using common logarithms.

13.0 Sequences and Series

13.1 Students will recognize whether sequences or series are (1) arithmetic, (2) geometric, or (3) neither arithmetic nor geometric.

13.2 Students will find the nth term of given (1) arithmetic sequences and (2) geometric sequences.

13.3 Students will find a specified number of means of given (1) arithmetic and (2) geometric sequences.

13.4 Students will find the sum of given (1) arithmetic, (2) geometric and (3) infinite series.

14.0 Binomial Expansion

14.1 Students will expand binomials using the Binomial Theorem.

14.2 Students will expand binomials using Pascal's Triangle.

14.3 Students will find a specified term in the expansion of a binomial.

INTRODUCTION
ALGEBRA II

State Accreditator Number. . 2216
Course Code Number 1611
F.T.E. Category. 1.10
Instructional Level. . . . . Standard

Report Card Abbreviation . . ALG 2
Length of Course . . . . . . Year
Credit . . . . 1 Math Credit
Grade Level. 10, 11, 12

Prerequisites

Math Teacher Recommendation/Mastery of Minimum Level Skills of Algebra I and/or Geometry.

Textbook(s)

Dolciani, Mary P., et al, Algebra and Trigonometry: Structure and Method, Book Two (Atlanta: Houghton Mifflin Company, 1979)

Notes to Teachers

Students will master the concepts and skills developed for Algebra II as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

ALGEBRA II

- 1.0 Real Numbers
    - 1.1 Field Properties
        - 1.1.1 Algebraic statements
        - 1.1.2 Algebraic proofs
    - 1.2 Simplify Numerical Expressions
        - 1.2.1 Order of operations
        - *1.2.2 Absolute value expressions
- 2.0 Open Sentences in One Variable
    - *2.1 Determine Solution Sets
        - 2.1.1 First degree equations
        - 2.1.2 First degree inequalities
        - 2.1.3 Absolute value open sentences
    - *2.2 Graph Solution Sets
        - 2.2.1 First degree inequalities
        - 2.2.2 Absolute value open sentences
    - 2.3 Solve Word Problems
        - *2.3.1 First degree equations
        - 2.3.2 First degree inequalities
- 3.0 Functions and Relations
    - 3.1 State Domain and Range
        - 3.1.1 Ordered pairs
        - 3.1.2 Mapping diagrams
        - 3.1.3 Rules
    - *3.2 Identify Functions
        - 3.2.1 Ordered pairs
        - 3.2.2 Mapping diagrams
        - 3.2.3 Graphs
    - *3.3 Determine Values
        - 3.3.1 Simple functions
        - 3.3.2 Composite functions
    - 3.4 Graph on Coordinate Plane
        - 3.4.1 Functions with specified domains
        - *3.4.2 Linear equations
        - *3.4.3 Linear inequalities
- 4.0 Slope & Equations of Lines
    - *4.1 Determine Slope
        - 4.1.1 Two points
        - 4.1.2 Equations
    - *4.2 Determine y-intercepts
    - 4.3 Determine Linear Equations
        - *4.3.1 Slope and a point
        - *4.3.2 Two points
        - *4.3.3 Slope and y-intercept
        - 4.3.4 Other pertinent data
    - 4.4 Direct Variation
        - 4.4.1 Proportions
        - 4.4.2 Word problems
- 5.0 Systems of Linear Equations/ Inequalities
    - 5.1 Apply Slope and y-intercept
        - 5.1.1 Intersecting lines
        - 5.1.2 Parallel lines
        - 5.1.3 Coincident Lines
    - 5.2 Solve Systems of Equations
        - 5.2.1 Graph
        - *5.2.2 Substitution
        - *5.2.3 Linear combination
        - 5.2.4 Cramer's Rule
    - *5.3 Solve Word Problems
    - 5.4 Indicate Solution Sets of Inequalities
- 6.0 Polynomials & Rational Expressions
    - *6.1 Use Laws of Exponents
        - 6.1.1 Simplify expressions
        - 6.1.2 Products of monomials
        - 6.1.3 Quotients of monomials
    - *6.2 Operations with Polynomials
        - 6.2.1 Add
        - 6.2.2 Subtract
        - 6.2.3 Multiply
        - 6.2.4 Divide

*Indicates Minimum Level Skills

ALGEBRA II

- 6.3 Factor Polynomials
- 6.4 Identify Solution Sets By Factoring
  - *6.4.1 Quadratic equations
  - 6.4.2 Quadratic inequalities
- *6.5 Operations With Rational Expressions
  - 6.5.1 Add
  - 6.5.2 Subtract
  - 6.5.3 Multiply
  - 6.5.4 Divide
- *6.6 Fractional Equations
  - 6.6.1 Determine solution sets
  - 6.6.2 Solve word problems

7.0 Radicals

- *7.1 Simplify Radical Expressions
- *7.2 Operations With Radicals
  - 7.2.1 Add
  - 7.2.2 Subtract
  - 7.2.3 Multiply
  - 7.2.4 Divide
- 7.3 Solve Radical Equations

8.0 Imaginary & Complex Numbers

- *8.1 Simplify Expressions
- *8.2 Operations With Complex Numbers
  - 8.2.1 Add
  - 8.2.2 Subtract
  - 8.2.3 Multiply
  - 8.2.4 Divide

9.0 Quadratic Equations

- 9.1 Determine Solution Sets
  - 9.1.1 Completing the square
  - *9.1.2 Quadratic formula
- 9.2 Determine Nature of Roots
- 9.3 Determine Equations From Roots
- *9.4 Solve Word Problems

10.0 Polynomial Functions

- 10.1 Use Synthetic Substitution or Division
  - 10.1.1 Values of polynomial functions
  - 10.1.2 Remainder Theorem
  - 10.1.3 Factor Theorem

11.0 Quadratic Relations

- 11.1 Find Distances Between Points
- 11.2 Circles
  - 11.2.1 Equations
  - 11.2.2 Graphs
  - 11.2.3 Characteristics
- 11.3 Parabolas
  - 11.3.1 Equations
  - 11.3.2 Graphs
  - 11.3.3 Characteristics
- 11.4 Ellipses
  - 11.4.1 Equations
  - 11.4.2 Graphs
  - 11.4.3 Characteristics
- 11.5 Hyperbolas
  - 11.5.1 Equations
  - 11.5.2 Graphs
  - 11.5.3 Characteristics
- *11.6 Systems of Quadratic Equations
  - 11.6.1 Solve linear-quadratic
  - 11.6.2 solve quadratic-quadratic
- 11.7 Solve Word Problems

12.0 Exponential and Logarithmic Functions

- 12.1 Evaluate Exponential Expressions
  - 12.1.1 Rational
  - 12.1.2 Irrational

ALGEBRA II

- 12.2 Exponential Equations
    - 12.2.1 Express in logarithmic form
    - 12.2.2 Solve equations
    - 12.2.3 Graph
- 12.3 Logarithmic Equations
    - 12.3.1 Express in exponential form
    - 12.3.2 Solve equations
    - 12.3.3 Graph

13.0 Sequences and Series

- 13.3 Recognize Sequences and Series
    - 13.1.1 Arithmetic
    - 13.1.2 Geometric
    - 13.1.3 Neither
- 13.2 Find nth Term
    - 13.2.1 Arithmetic
    - 13.2.2 Geometric
- 13.3 Find Means of Sequences
    - 13.3.1 Arithmetic
    - 13.3.2 Geometric
- 13.4 Find Sums of Series
    - 13.4.1 Arithmetic
    - 13.4.2 Geometric

PERFORMANCE OBJECTIVES
ALGEBRA II

Algebra II is a course which extends the study of the structure and properties of the system of real numbers and introduces the structure and properties of the system of complex numbers. Problem solving techniques are expanded and equations, inequalities, polynomials and functions are treated thoroughly. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minumum Level Skills Test.

Performance Objectives

1.0 Real Numbers

1.1 To demonstrate knowledge of field properties, students will: (1) justify algebraic statements and (2) provide reasons for steps in algebraic proofs.

1.2 Students will simplify numerical expressions using the concepts of

(1) order of operations and

*(2) absolute value.

2.0 Open Sentences in One Variable

*2.1 Students will determine solution sets for (1) first degree equations, (2) first degree inequalities, and (3) absolute value open sentences.

*2.2 Students will graph solution sets for (1) first degree inequalities and (2) absolute value open sentences.

*2.3 Students will solve word problems involving

*(1) first degree equations and

(2) first degree inequalities.

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*Indicates Minimum Level Skills

3.0 Functions and Relations

3.1 Students will state the domain and range when given (1) ordered pairs, (2) mapping diagrams and (3) rules for relations.

*3.2 Students will identify functions when given (1) ordered pairs, (2) mapping diagrams, and (3) graphs of relations.

*3.3 Students will determine values of (1) simple and (2) composite functions.

3.4 Students will graph:

(1) functions with specified domains,

*(2) linear equations, and

*(3) linear inequalities on the coordinate plane.

4.0 Slope and Equations of Lines

*4.1 Students will determine the slope of a line given (1) two points on the line and (2) the equation of the line.

*4.2 Students will determine the y-intercept of a line given the equation of a line.

4.3 Students will determine an equation of a line in the form Ax + By = C when given

*(1) the slope and a point on the line

*(2) two points on the line

*(3) the slope and y-intercept of the line, and

(4) other pertinent data.

4.4 Students will apply the concept of direct variation to solve (1) proportions and (2) word problems involving proportions.

5.0 Inequalities and Systems of Linear Equations

5.1 Students will apply the concepts of slope and y-intercept to determine (1) intersecting lines, (2) parallel lines, and (3) coincident lines.

5.2 Students will solve systems of linear equations in two variables by

(1) graphing,

*(2) substitution,

*(3) linear combination, and

(4) Cramer's Rule.

*5.3 Students will solve word problems involving systems of linear equations.

5.4 Students will indicate solution sets of systems of linear inequalities by graphing the inequalities and shading the intersection.

6.0 Polynomials and Rational Expressions

*6.1 Students will use the laws of exponents to simplify (1) expressions, (2) products of monomials and (3) quotients of monomials.

*6.2 Students will (1) add, (2) subtract, (3) multiply, and (4) divide polynomial expressions, simplifying the results when possible.

6.3 Students will factor specified polynomials.

6.4 Students will find the solution sets of

*(1) quadratic equations and

(2) quadratic inequalities by factoring the sentences.

*6.5 Students will (1) add, (2) subtract, (3) multiply, and (4) divide rational expressions, simplifying the results when possible.

*6.6 Students will (1) determine solution sets of fractional equations and (2) solve word problems involving fractional equations.

7.0 Radicals

*7.1 Students will simplify radical expressions using the properties of radicals.

*7.2 Students will (1) add, (2) subtract, (3) multiply, and (4) divide radical expressions simplifying the results when possible.

7.3 Students will solve specified equations containing radicals.

8.0 Imaginary and Complex Numbers

*8.1 Students will simplify expressions containing square root radicals whose radicands are negative numbers.

*8.2 Students will (1) add, (2) subtract, (3) multiply, and (4) divide complex numbers, writing the results in simplified form.

9.0 Quadratic Equations

9.1 Students will determine solution sets of quadratic equations by

(1) completing the square and

*(2) using the quadratic formula.

9.2 Students will determine the nature of the roots of quadratic equations using the discriminant.

9.3 Students will determine a quadratic equation in the form $ax^2 + bx + c = 0$ when given the roots of the equation.

*9.4 Students will solve word problems involving quadratic equations.

10.0 Polynomial Functions

10.1 Students will use synthetic substitution or division to (1) determine values of polynomial functions, (2) find quotients and remainders of polynomials, and (3) determine if binomials are factors.

11.0 Quadratic Relations

11.1 Students will find distances between points using the distance formula.

11.2 Given appropriate information, students will (1) write equations, (2) graph, and (3) state characteristics for circles.

11.3 Given appropriate information, students will (1) write equations, (2) graph, and (3) state characteristics for parabolas.

11.4 Given appropriate information, students will (1) write equations, (2) graph, and (3) state characteristics for ellipses.

11.5 Given appropriate information, students will (1) write equations, (2) graph, and (3) state characteristics for hyperbolas.

*11.6 Students will solve specified systems of (1) linear-quadratic and (2) quadratic-quadratic equations.

11.7 Students will solve word problems involving linear-quadratic and quadratic-quadratic systems.

12.0 Exponential and Logarithmic Functions

12.1 Students will evaluate exponential expressions involving (1) rational and (2) irrational exponents.

12.2 Students will (1) express exponential equations in logarithmic form, (2) solve exponential equations, and (3) graph exponential equations.

12.3 Students will (1) express logarithmic equations in exponential form, (2) solve logarithmic equations and (3) graph logarithmic equations.

13.0 Sequences and Series

13.1 Students will recognize whether sequences or series are (1) arithmetic, (2) geometric, or (3) neither arithmetic nor geometric.

13.2 Students will find the nth term of given (1) arithmetic and (2) geometric sequences.

13.3 Students will find a specified number of means of given (1) arithmetic and (2) geometric sequences.

13.4 Students will find the sum of given (1) arithmetic, and (2) geometric series.

INTRODUCTION

ALGEBRA III

State Accreditator Number. .	2217
Course Code Number	1620
F.T.E. Category.	1.10
Instructional Level.	Advanced
Report Card Abbreviation . .	ADV ALG 3
Length of Course	Semester
Credit	1/2 Math Credit
Grade Level.	10,11, 12

Prerequisites

Algebra II

Textbook(s)

Brown, Richard G., et al, Advanced Mathematics: An Introductory Course (Atlanta: Houghton Mifflin Company, 1978)

Notes to Teachers

Students will master the concepts and skills developed for Algebra III as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks(*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

ALGEBRA III

1.0 Exponential/Logarithmic Functions

- *1.1 Evaluate Exponential Expressions
  - 1.1.1 Integral
  - 1.1.2 Rational
  - 1.1.3 Irrational
- *1.2 Exponential Equations
  - 1.2.1 Express in logarithmic form
  - 1.2.2 Solve equations
- *1.3 Logarithmic Equations
  - 1.3.1 Express in exponential form
  - 1.3.2 Solve equations
- *1.4 Compute with Common Logarithms

2.0 Sequences/Series

- *2.1 Recognize Sequences/Series
  - 2.1.1 Arithmetic
  - 2.1.2 Geometric
  - 2.1.3 Neither
- *2.2 Find nth Term
  - 2.2.1 Arithmetic
  - 2.2.2 Geometric
- *2.3 Find Means of Sequences
  - 2.3.1 Arithmetic
  - 2.3.2 Geometric
- *2.4 Find Sums of Series
  - 2.4.1 Arithmetic
  - 2.4.2 Geometric
  - 2.4.3 Infinite

3.0 Polynomial Functions

- *3.1 Use Synthetic Substitution or Division
  - 3.1.1 Values of polynomial functions
  - 3.1.2 Remainder Theorem
  - 3.1.3 Factor Theorem
- *3.2 Factor Polynomials
  - 3.2.1 Integer
  - 3.2.2 Rational
  - 3.2.3 Real
  - 3.2.4 Complex
- *3.3 Determine Roots
  - 3.3.1 Rational Root Theorem
  - 3.3.2 Bounds for real roots
  - 3.3.3 Fundamental Theorem of Algebra
- 3.4 Sketch Polynomial Functions
  - 3.4.1 Plot points
  - 3.4.2 Limits/slopes/derivatives, maxima/minima/inflection points

4.0 Matrices

- 4.1 Specify Dimensions
- 4.2 Identify Equal Matrices
- 4.3 Compute Sums & Differences
- 4.4 Compute Products
  - 4.4.1 Scalar
  - 4.4.2 Matrix
- 4.5 Find Inverses
- 4.6 Solve Systems of Linear Equations

5.0 Permutations/Combinations/Probability

- 5.1 Use the Fundamental Counting Principles
- 5.2 Permutations
  - 5.2.1 Definition
  - 5.2.2 Simplify permutation notation
  - 5.2.3 Simplify factorial notation
  - 5.2.4 Problem solving
- 5.3 Combinations
  - 5.3.1 Definition
  - 5.3.2 Simplify combination notation
  - 5.3.3 Binomial expansion
  - 5.3.4 Problem solving

*Indicates Minimum Level Skills

ALGEBRA III

- 5.4 Probability
  - 5.4.1 Definition
  - 5.4.2 Random experiments
  - 5.4.3 Problem solving

PERFORMANCE OBJECTIVES
ALGEBRA III

Algebra III is a semester course which extends the topics of Algebra II and introduces more advanced topics of mathematics. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Exponential and Logarithmic Functions

*1.1 Students will evaluate exponential expressions involving (1) integral, (2) rational, and (3) irrational exponents.

*1.2 Students will (1) express exponential equations in logarithmic form and (2) solve exponential equations.

*1.3 Students will (1) express logarithmic equations in exponential form and (2) solve logarithmic equations.

*1.4 Students will compute using common logarithms.

2.0 Sequences and Series

*2.1 Students will recognize sequences or series which are (1) arithmetic, (2) geometric, or (3) neither arithmetic nor geometric.

*2.2 Students will find the nth terms of given (1) arithmetic sequences and (2) geometric sequences.

*2.3 Students will find a specified number of means of given (1) arithmetic sequences and (2) geometric sequences.

*2.4 Students will find the sum of given (1) arithmetic series, (2) geometric series, and (3) infinite series.

3.0 Polynomial Functions

*3.1 Students will use synthetic substitution or synthetic division to (1) determine values of polynomial functions, (2) find quotients and remainders of polynomials, and (3) determine if binomials are factors of given polynomials.

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*Indicates Minimum Level Skills

*3.2 Students will factor polynomials over the set of (1) integers, (2) rational numbers, (3) real numbers, and (4) complex numbers.

*3.3 Students will determine roots of polynomial equations using (1) the Rational Root Theorem, (2) rules involving bounds for real roots, and (3) the Fundamental Theorem of Algebra.

3.4 Students will sketch the graph of polynomial functions by: (1) plotting points and (2) by using the concepts of limits, slopes and derivatives, maxima and minima, and inflection points.

4.0 Matrices

4.1 Students will specify the dimensions of given matrices.

4.2 Students will identify conditions for producing equal matrices.

4.3 Students will compute sums and differences for given matrices.

4.4 Students will compute products (1) of a scalar and a matrix and (2) of matrices.

4.5 Students will find inverses for nonsingular matrices.

4.6 Students will solve systems of linear equations using determinants.

5.0 Permutations, Combinations, and Probability

5.1 Students will use the fundamental counting principles to solve problems.

5.2 Students will (1) recognize the definition of permutation, (2) simplify permutation notation, (3) simplify factorial notation and (4) solve permutation problems.

5.3 Students will (1) recognize the definition of combination, (2) simplify combination notation, (3) expand binomials and (4) solve combination problems.

5.4 Students will (1) recognize the definition of probability, (2) perform random experiments and (3) solve probability problems.

INTRODUCTION
ANALYSIS

State Accreditator Number. .	2286
Course Code Number	1720
F.T.E. Category.	1.10
Instructional Level.	Advanced

Report Card Abbreviation . .	ADV ANALYSIS
Length of Course	Year
Credit	1 Math Credit
Grade Level.	11, 12

Prerequisites

A or B Average in Algebra II or Math Teacher Recommendation

Textbook(s)

Dolciani, Mary P., et al, Modern Introductory Analysis (Atlanta: Houghton Mifflin Company, 1977)

Notes to Teachers

Students will master the concepts and skills developed for Analysis as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

ANALYSIS

1.0 Order Properties

- 1.1 Solve Inequalities
  - 1.1.1 Linear
  - 1.1.2 Quadratic
- *1.2 Solve Absolute Value Equations
- *1.3 Solve Absolute Value Inequalities

2.0 Sequences and Series

- 2.1 Write Sequences
  - 2.1.1 General form
  - 2.1.2 Recursive form
- *2.2 Specify Series by Summation Notation
- *2.3 Find Terms of Sequences
  - 2.3.1 Arithmetic
  - 2.3.2 Geometric
- 2.4 Find Means of Sequences
  - 2.4.1 Arithmetic
  - 2.4.2 Geometric
- 2.5 Find Sums of Series
  - 2.5.1 Arithmetic
  - 2.5.2 Geometric
- 2.6 Find Limits of Sequences
  - 2.6.1 Definition
  - *2.6.2 $\lim_{n\to\infty} \frac{1}{n} = 0$
- 2.7 Find Sums of Infinite Series
  - 2.7.1 Geometric
  - 2.7.2 Repeating decimals
- 2.8 Mathematical Induction

3.0 Binomial Theorem

- 3.1 Determine Coefficients
- *3.2 Find Indicated Terms
- 3.3 Write Expansions

4.0 Vectors

- 4.1 Determine Cartesian Products
- *4.2 Find Sums
- *4.3 Find Norms
- 4.4 Multiply Vectors by Scalars
- 4.5 Find Inner Products
- 4.6 Identify Relationships
  - 4.6.1 Parallel
  - 4.6.2 Perpendicular
- 4.7 Find Components

5.0 Points and Lines

- 5.1 Write Equations of Lines
  - 5.1.1 Point-slope
  - 5.1.2 Slope-intercept
- 5.2 Prove Geometric Theorems
- 5.3 Determine Distances
- 5.4 Find Intersections of Lines
  - 5.4.1 Substitution
  - 5.4.2 Linear combination
  - *5.4.3 Cramer's Rule

6.0 Relations and Functions

- 6.1 State Domain and Range
- 6.2 Graph Linear Relations
- *6.3 Distinguish Relations From Functions
- 6.4 Evaluate Functions
- 6.5 Graph Functions
  - 6.5.1 Greatest integer
  - 6.5.2 Absolute value
  - *6.5.3 Special
- 6.6 Special Sums and Products
  - 6.6.1 Rule
  - 6.6.2 Graph

7.0 Polynomial Functions

- 7.1 Find Sums and Products
- 7.2 Determine Quotients and Remainders
  - 7.2.1 Long division
  - 7.2.2 Synthetic division
- *7.3 Factor Theorem

*Indicates Minimum Level Skills

ANALYSIS

- *7.4 Determine Rational Roots
- *7.5 Determine Bounds For Real Roots
- 7.6 Descartes' Rule of Signs

8.0 Complex Numbers

- *8.1 Find Sums
- *8.2 Find Absolute Values
- *8.3 Find Products
- 8.4 Find Square Roots

9.0 Solutions of Equations

- 9.1 Quadratic Formula
- 9.2 Fundamental Theorem of Algebra
- 9.3 Relationship Between Roots and Coefficients

10.0 Limits and Continuity of Functions

- 10.1 Determine Limits
- 10.2 Determine Intervals of Continuity

11.0 Slopes and Derivatives of Polynomial Functions

- 11.1 Find Slopes
  - 11.1.1 Definition
  - *11.1.2 Power function rule
- *11.2 Find Derivatives
  - 11.2.1 First derivatives
  - 11.2.2 Second derivatives
- *11.3 Determine Critical Values
  - 11.3.1 Maxima
  - 11.3.2 Minima
  - 11.3.3 Inflection points
- 11.4 Applications
  - 11.4.1 Graphing
  - 11.4.2 Extreme value problems

12.0 Exponential and Logarithmic Functions

- 12.1 Simplify Exponential Expressions
- 12.2 Graph Exponential Functions
- *12.3 Write Inverses
  - 12.3.1 Exponential to logarithmic
  - 12.3.2 Logarithmic to exponential
- 12.4 Simplify Logarithmic Expressions
- 12.5 Solve Logarithmic Equations

13.0 Circular Functions

- 13.1 Specify Coordinates
- *13.2 Find Special Values
- 13.3 State Domain and Range
- *13.4 Graph Basic Functions
- 13.5 Variations of Sine and Cosine
  - 13.5.1 Amplitude, period phase shift
  - 13.5.2 Graph
- 13.6 Variations of Tangent, Cotangent, Secant, and Cosecant
  - 13.6.1 Period, phase shift, asymptotes
  - 13.6.2 Graph

14.0 Trigonometry

- *14.1 Convert Angle Measures
  - 14.1.1 Radians to degrees
  - 14.1.2 Degrees to radians
- 14.2 Find Values For Trigonometric Functions
  - *14.2.1 One function
  - 14.2.2 Tables

ANALYSIS

15.0 Trigonometric Identities

- 15.1 Prove Identities Using
  - 15.1.1 Eight fundamental identities
  - 15.1.2 Sum and difference formulas
  - 15.1.3 Double- and half-angle formulas
  - 15.1.4 Reduction formulas
- *15.2 Simplify Expressions
- *15.3 Solve Equations

16.0 Trigonometric Inverses

- 16.1 Define
- 16.2 Graph
- *16.3 Evaluate Expressions
- 16.4 Solve Open Sentences

17.0 Triangles

- *17.1 Solve Right Triangles
- *17.2 Solve General Triangles
  - 17.2.1 Law of Sines
  - 17.2.2 Law of Cosines
- 17.3 Find Areas

18.0 Polar Coordinates and Graphs

- 18.1 Convert Between Systems
  - 18.1.1 Coordinates
  - 18.1.2 Equations
- 18.2 Graph Polar Systems
- 18.3 Operations on Complex Numbers
  - 18.3.1 Add & subtract
  - 18.3.2 Multiply & divide
  - 18.3.3 Raise to powers
  - 18.3.4 DeMoivre's Theorem

19.0 Second-Degree Loci

- 19.1 Circles
  - 19.1.1 Equations
  - *19.1.2 Graphs
  - 19.1.3 Characteristics
- 19.2 Parabolas
  - 19.2.1 Equations
  - *19.2.2 Graphs
  - 19.2.3 Characteristics
- 19.3 Ellipses
  - 19.3.1 Equations
  - *19.3.2 Graphs
  - 19.3.3 Characteristics
- 19.4 Hyperbolas
  - 19.4.1 Equations
  - *19.4.2 Graphs
  - 19.4.3 Characteristics

20.0 Transformations

- 20.1 Determine Images Under Translation
  - 20.1.1 Parabolas
  - 20.1.2 Ellipses
  - 20.1.3 Hyperbolas
- 20.2 Determine Images Under Rotation
  - 20.2.1 Circles
  - 20.2.2 Ellipses
  - 20.2.3 Hyperbolas
- 20.3 Transformation of Coordinates

21.0 Matrices

- 21.1 Specify Dimensions
- 21.2 Identify Conditions For Equal Matrices
- 21.3 Name Transposes
- 21.4 Identify Special Matrices
  - 21.4.1 Identity
  - 21.4.2 Zero
  - 21.4.3 Diagonal
- 21.5 Compute Sums
- 21.6 Find Products
  - 21.6.1 Scalars
  - 21.6.2 Matrices
- 21.7 Find Inverses (2x2)

PERFORMANCE OBJECTIVES
ANALYSIS

The relationship of Algebra, Trigonometry, and Analytic Geometry are stressed in this Pre-Calculus course. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Order Properties

1.1 Students will solve given (1) linear and (2) quadratic inequalities in one variable over the set of real numbers.

*1.2 Given sentences of the form $|ax + b| = c$ where a, b, and c are real numbers, students will find the solution set over the set of real numbers.

*1.3 Given sentences of the form $|ax + b| < c$ or $|ax + b| > c$, where a, b, and c are real numbers, students will find the solution set over the set of real numbers.

2.0 Sequences and Series

2.1 Students will write given sequences in (1) general form and (2) recursive form.

*2.2 Students will specify given series by use of summation notation.

*2.3 Students will find indicated terms of given (1) arithmetic sequences and (2) geometric sequences.

2.4 Students will find (1) arithmetic means and (2) geometric means between specified terms.

2.5 Students will find sums of given (1) arithmetic series and (2) geometric series.

2.6 Students will find limits of convergent sequences by use of:

(1) the definition and

(2) $\lim\limits_{n\to\infty} \frac{1}{n} = 0$.

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*Indicates Minimum Level Skills

2.7 Students will determine (1) sums of infinite geometric series and (2) values of repeating decimals.

2.8 Students will prove given theorems by use of mathematical induction.

3.0 Binomial Theorem

3.1 Students will determine the coefficients for indicated binomial expansions.

*3.2 Students will find indicated terms of specified expansions.

3.3 Students will write expansions for given binomials.

4.0 Vectors

4.1 Students will determine Cartesian products of given sets.

*4.2 Students will find sums of given vectors.

*4.3 Students will find norms of given vectors.

4.4 Students will multiply vectors by

4.5 Students will find inner products of given vectors.

4.6 Students will identify (1) parallel vectors, and scalars. (2) perpendicular vectors when given a set of vectors.

4.7 Students will find vertical and horizontal components of given vectors.

5.0 Points and Lines

5.1 Given appropriate information, students will write equations of lines in (1) point-slope form and (2) slope-intercept form.

5.2 Students will prove given geometric theorems by use of coordinate geometry.

5.3 Students will determine distances between given points and lines.

5.4 Students will find intersections of given lines by

(1) substitution,
(2) linear combination, and
*(3) Cramer's Rule.

6.0 Relations and Functions

6.1 Students will state the domain and range of given relations.

6.2 Students will graph linear relations defined by given open sentences.

*6.3 Students will distinguish between relations and functions.

6.4 Students will evaluate functions for given domains.

6.5 Students will graph:

(1) greatest integer functions,

(2) absolute value functions, and

*(3) special functions.

6.6 Students will specify sums and products of given functions by (1) rule and (2) graph.

7.0 Polynomial Functions

7.1 Students will find sums and products of given polynomials.

7.2 Students will use (1) long division and (2) synthetic substitution to determine quotients and remainders.

*7.3 Students will determine whether binomials are factors of given polynomials by use of the Factor Theorem.

*7.4 Students will determine the rational roots of given polynomial equations by use of the Rational Root Theorem.

*7.5 Students will determine the upper and lower bounds for the real roots of given polynomial equations.

7.6 Students will use Descartes' Rule of Signs to determine the number of positive and negative real roots for given polynomial equations.

8.0 Complex Numbers

*8.1 Students will find sums of given complex numbers.

*8.2 Students will find absolute values of given complex numbers.

*8.3 Students will find products of given complex numbers.

8.4 Students will find square roots of given complex numbers.

9.0 Solutions of Equations

9.1 Students will use the Quadratic Formula to solve quadratic equations over the set of complex numbers.

9.2 Students will use a corollary of the Fundamental Theorem of Algebra to determine the number of complex roots for given equations.

9.3 Students will use relationships between roots and coefficients to find solutions for given polynomial equations.

10.0 Limits and Continuity of Functions

10.1 Students will determine limits of given algebraic functions.

10.2 Students will determine the intervals of continuity for given functions.

11.0 Slope and Derivatives of Polynomial Functions

11.1 Students will find the slope of given functions by using:

(1) the definition of the "slope of a curve" and

*(2) the power function rule.

*11.2 Students will find the (1) first and (2) second derivatives of given functions.

*11.3 Given functions, students will determine critical values including (1) maximum, (2) minimum, and (3) points of inflection.

11.4 Students will (1) graph given functions and (2) solve extreme value problems.

12.0 Exponential and Logarithmic Functions

12.1 Students will simplify given exponential expressions.

12.2 Students will graph given exponential functions.

*12.3 Given exponential and logarithmic functions, students will write their inverses.

12.4 Students will simplify given logarithmic expressions.

12.5 Students will solve given logarithmic equations.

13.0 Circular Functions

13.1 Students will specify coordinates of points on the unit circle which are at a given distance from the point (1,0).

*13.2 Students will find sin x, cos x, tan x, cot x, sec x, and csc x for $x \varepsilon \{2k\pi, \frac{k\pi}{6}, \frac{k\pi}{4}, \frac{k\pi}{3}, \frac{k\pi}{2}$, k is an integer$\}$.

13.3 Students will state the domain and range of each of the circular functions.

*13.4 Students will graph:

$\{(x, y): y = \sin x\}$,

$\{(x, y): y = \cos x\}$,

$\{(x, y): y = \tan x\}$,

$\{(x, y): y = \cot x\}$,

$\{(x, y): y = \sec x\}$, and

$\{(x, y): y = \csc x\}$.

13.5 Given functions of the form $\{(x, y): y = A \sin(Bx + C)\}$ and $\{(x, y): y = A \cos(Bx + X)\}$, students will (1) find the amplitude, period, and phase shift and (2) graph each function.

13.6 Given functions of the form $\{(x, y): y = A \tan(Bx + C)\}$, $\{(x, y): y = A \cot(Bx + C)\}$, $\{(x, y): y = A \sec(Bx + C)\}$, and $\{(x, y): y = A \csc(Bx + C)\}$, students will (1) find the period, phase shift, and asymptotes and (2) graph each function.

14.0 Trigonometry

*14.1 Students will convert given angle measures (1) from radians to degrees and (2) from degrees to radians.

14.2 Students will find values of trigonometric functions:

*(1) from one given function and

(2) from trigonometric tables.

15.0 Trigonometric Identities

15.1 Students will prove identities using (1) the eight fundamental identities, (2) sum and difference formulas, (3) double- and half-angle formulas, and (4) reduction formulas.

*15.2 Students will simplify given trigonometric identities.

*15.3 Students will solve given trigonometric equations.

16.0 Trigonometric Inverses

16.1 Students will define the inverses of the six trigonometric functions.

16.2 Students will graph the inverses of the six trigonometric functions.

*16.3 Students will evaluate given expressions.

16.4 Students will solve given open sentences.

17.0 Triangles

*17.1 Students will solve given right triangles.

*17.2 Students will solve given general triangles using (1) the Law of Sines or (2) the Law of Cosines.

17.3 Students will find areas of given triangles.

18.0 Polar Coordinates and Graphs

18.1 Students will convert given (1) coordinates and (2) equations between rectangular and polar systems.

18.2 Students will sketch the polar graphs of given equations.

18.3 To demonstrate knowledge of the operations on complex numbers, students will:

(1) add and subtract given complex numbers,

(2) multiply and divide given complex numbers,

(3) raise complex numbers to given powers, and

(4) use DeMoivre's Theorem to find the roots of given complex numbers.

19.0 Second-Degree Loci

19.1 Given appropriate information, students will:

(1) write equations,

*(2) graph, and

(3) state characteristics for circles.

19.2 Given appropriate information, students will:

(1) write equations,

*(2) graph, and

(3) state characteristics for parabolas.

19.3 Given appropriate information, students will:

(1) write equations,

*(2) graph, and

(3) state characteristics for ellipses.

19.4 Given appropriate information, students will:

(1) write equations,

*(2) graph, and

(3) state characteristics for hyperbolas.

20.0 Transformations

20.1 Students will determine the images of (1) parabolas, (2) ellipses, and (3) hyperbolas under specified translations.

20.2 Students will determine the images of (1) circles, (2) ellipses, and (3) hyperbolas under specified rotations.

20.3 Given equations of the form $Ax^2+Bxy+Cy^2+Dx+Ey+F = 0$ students will apply suitable translations and rotations to produce equations free of linear and mixed terms.

21.0 Matrices

21.1 Students will specify the dimensions of given matrices.

21.2 Students will identify conditions for producing equal matrices.

21.3 Students will name the transposes of given matrices.

21.4 Students will identify the (1) identity matrix, (2) zero matrix, and (3) diagonal matrix from given matrices.

21.5 Students will compute sums of given matrices.

21.6 Students will find products resulting from (1) scalar multiplication and (2) matrix multiplication.

21.7 Students will find inverses of given 2x2 non-singular matrices.

INTRODUCTION
CALCULUS

State Accreditator Number. . 2297
Course Code Number 1735
F.T.E. Category. 1.10
Instructional Level. . . . . Advanced

Report Card Abbreviation . . ADV CALCULUS
Length of Course . . . . . . Year
Credit . . . . 1 Math Credit
Grade Level. 11, 12

Prerequisites

Recommendation of Calculus Teacher

Textbook(s)

Thomas, George B., Elements of Calculus and Analytic Geometry, 4th Edition (Menlo Park, California: Addison-Wesley Publishing Company, 1972).

Notes to Teachers

Students will master the concepts and skills developed for Calculus as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

COURSE OUTLINE

CALCULUS

- 1.0 Elementary Functions
  - 1.1 Determine Properties
    - 1.1.1 Domain/range
    - 1.1.2 Period
    - 1.1.3 Amplitude
    - 1.1.4 Zeros
    - 1.1.5 Absolute value
    - 1.1.6 Odd/even
  - *1.2 Graph
    - 1.2.1 Symmetry
    - 1.2.2 Asymptotes
  - *1.3 Perform Arithmetic Operations
  - *1.4 Form Composites
  - 1.5 Form Inverses
  - 1.6 Apply Trigonometric Relations
    - 1.6.1 Expressions
    - 1.6.2 Equations
  - 1.7 Define "e"
    - 1.7.1 Base of logarithmic system
    - 1.7.2 Limit expression
  - 1.8 Define a^u
  - 1.9 Define $\log_a u$
  - *1.10 Apply Properties of Limits
    - 1.10.1 Sum
    - 1.10.2 Product
    - 1.10.3 Quotient
    - 1.10.4 "Squeeze Theorem"
    - 1.10.5 Infinity
    - 1.10.6 $\lim\limits_{x \to 0} \frac{\sin x}{x}$
  - 1.11 Continuity
    - 1.11.1 Definition
    - 1.11.2 Intermediate Value Theorem
    - 1.11.3 Extreme Value Theorem

- 2.0 Derivative/Differentiation
  - 2.1 Define the Derivative
    - 2.1.1 Limit quotient
    - 2.1.2 Geometric Interpretation
  - *2.2 Differentiate Elementary Functions
    - 2.2.1 Algebraic
    - 2.2.2 Trigonometric
    - 2.2.3 Exponential
    - 2.2.4 Logarithmic
  - *2.3 Differentiate Combinations
    - 2.3.1 Sum
    - 2.3.2 Product
    - 2.3.3 Quotient
    - 2.3.4 Composite (chain rule)
  - *2.4 Differentiate Implicit Functions
  - 2.5 Differentiate Inverse Functions
  - 2.6 Apply Logarithmic Differentiation
  - *2.7 Determine Higher Order Derivatives

- 3.0 Applications of Derivatives
  - *3.1 Determine Slope
    - 3.1.1 Tangents
    - 3.1.2 Normals
  - *3.2 Sketch Curves
    - 3.2.1 Increasing/decreasing
    - 3.2.2 Maxima/minima
    - 3.2.3 Concavity
    - 3.2.4 Inflection
  - *3.3 Find Extreme Values
  - *3.4 Determine Motion Along a Line
    - 3.4.1 Velocity
    - 3.4.2 Acceleration
  - 3.5 Determine Rates of Change
    - 3.5.1 Average
    - 3.5.2 Instantaneous
  - 3.6 Solve Related Rate Problems
  - 3.7 Apply L'Hospital's Rule
  - 3.8 State Theorems
    - 3.8.1 Rolle's Theorem
    - 3.8.2 Mean Value Theorem

*Indicates Minimum Level Skills

CALCULUS

4.0 Antiderivative/Applications

- 4.1 Define Indefinite Integration
- 4.2 Use Techniques of Integration
  - *4.2.1 Basic formulas
  - *4.2.2 Simple substitution
  - 4.2.3 Trigonometric substitution
  - 4.2.4 Integration by parts
  - 4.2.5 Partial fractions
- *4.3 Solve Motion Problems
  - 4.3.1 Distance from velocity
  - 4.3.2 Velocity from acceleration
- 4.4 Solve $y' = ky$
  - 4.4.1 Growth
  - 4.4.2 Decay problems

5.0 Definite Integrals

- 5.1 Define Concept
  - 5.1.1 Area under curve
  - 5.1.2 Limit of a sum
- 5.2 Approximate Areas Under Curves
  - 5.2.1 Rectangles
  - 5.2.2 Trapezoids
  - 5.2.3 Mean Value Theorem for Integrals
- *5.3 Apply the Fundamental Theorem

6.0 Applications of Definite Integrals

- 6.1 Find Average (Mean) Values
- *6.2 Find Area Between Curves
- *6.3 Find Volumes of Solids of Revolution
  - 6.3.1 Discs
  - 6.3.2 Cylindrical shells
- 6.4 Interpret $\ln x$
  - 6.4.1 Area under $y = x^{-1}$
  - 6.4.2 Infinite Series

PERFORMANCE OBJECTIVES
CALCULUS

The selection of topics in this college level calculus course meets the requirements set forth in the syllabus of the College Entrance Examination Board for the AB examination. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Elementary Functions

1.1 Students will determine the (1) domain and range, (2) period, (3) amplitude, (4) zeros, (5) absolute value, and (6) odd or even nature of given elementary functions.

*1.2 Students will graph given functions by applying: (1) symmetry, (2) asymptotes, and (3) extent.

*1.3 Students will perform arithmetic operations on given functions.

*1.4 Students will form composites of given functions.

1.5 Students will form inverses of given fractions.

1.6 Students will apply trigonometric relations to (1) simplify expressions and (2) solve equations.

1.7 Students will define "e" as:

(1) the base of the natural logarithmic system and

(2) $\lim_{h \to 0} (1 + h)^{\frac{1}{h}}$

1.8 Students will define a^u in terms of e^u using appropriate restrictions.

1.9 Students will define $\log_a u$ in terms of ln u and ln a using appropriate restrictions.

*1.10 Students will apply properties of limits including (1)sums, (2) products, (3) quotients, (4) the "Squeeze Theorem", (5) infinity, and (6) $\lim_{x \to 0} \frac{\sin x}{x}$ to evaluate given limit expressions.

1.11 Students will (1) define the concept of continuity and apply the concept to (2) the Intermediate Value Theorem, and (3) the Extreme Value Theorem.

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*Indicates Minimum Level Skills

2.0 Derivative and Differentiation

2.1 Students will define the derivative by (1) writing the limit quotient and (2) recognizing a geometric interpretation.

*2.2 Students will differentiate elementary functions including: (1) algebraic, (2) trigonometric, (3) exponential, and (4) logarithmic functions.

*2.3 Students will differentiate (1) sums, (2) products, (3) quotients, and (4) composites of elementary functions.

*2.4 Students will differentiate implicit functions.

2.5 Students will differentiate inverse functions.

2.6 Students will apply logarithmic differentiation to determine the derivative of given functions.

*2.7 Students will determine higher order derivatives.

3.0 Applications of Derivatives

*3.1 Students will determine the slope of the graph of given functions with applications to (1) tangents and (2) normals.

*3.2 Students will sketch curves by applying (1) intervals of increase or decrease, (2) maxima and minima, (3) concavity, and (4) points of inflection.

*3.3 Students will find extreme values of given functions.

*3.4 Students will determine motion along a line including (1) velocity and (2) acceleration.

3.5 Students will determine (1) average and (2) instantaneous rates of change of given functions.

3.6 Students will solve appropriate related rate problems.

3.7 Students will apply L'Hospital's Rule to determine specified limits.

3.8 Students will state (1) Rolle's Theorem and (2) the Mean Value Theorem.

4.0 Antiderivative and Applications

4.1 Students will define indefinite integration in terms of the "antiderivative".

4.2 To evaluate given integrals, students will use the following techniques of integration:

- *(1) basic formulas,
- *(2) simple substitution,
- (3) trigonometric substitution,
- (4) integration by parts, and
- (5) partial fractions.

*4.3 Students will solve motion problems by finding (1) distance from velocity and (2) velocity from acceleration.

4.4 Students will solve the differential equation ($y' = ky$) with applications to (1) growth and (2) decay problems.

5.0 Definite Integrals

5.1 Students will define the definite integral as (1) the area under a curve and (2) the limit of a sum.

5.2 Students will approximate areas under curves using (1) rectangles, (2) trapezoids, and (3) the Mean Value Theorem for Integrals.

*5.3 Students will apply the Fundamental Theorem of Calculus to evaluate definite integrals.

6.0 Applications of Definite Integrals

6.1 Students will find the average (mean) value of a given function over a given interval.

*6.2 Students will find the area between curves.

*6.3 Students will find volumes of solids of revolutions by using: (1) the disc method and (2) the cylindrical shell method.

6.4 Students will interpret ln x as

- (1) the area under the curve $y = x^{-1}$ and
- (2) the sum of an infinite series.

INTRODUCTION

COMPUTER LITERACY

State Accreditator Number	2282
Course Code Number	1451
F.T.E. Category	1.10
Instructional Level	Standard
Report Card Abbreviation	COMP LIT
Length of Course	Semester
Credit	1/2 Elective Credit
Grade Level	10, 11, 12

Prerequisites

Teacher Recommendation

Textbook(s)

Golden, Neal, Computer Programming in the BASIC Language (Atlanta: Harcourt, Brace, Jovanovich, Inc., 1975).

Supplementary Material(s)

Kemeny, John G. and Thomas E. Kurtz, BASIC Programming (New York: John Wiley & Sons, 1980).

Zabinski, Michael P., Introduction to TRS-80 Level II BASIC and Computer Programming (Englewood Cliffs: Prentice-Hall, 1980).

Notes to Teachers

Students will master the concepts and skills developed for Computer Literacy as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

COMPUTER LITERACY

1.0 Computer Systems

- *1.1 Major Components
- 1.2 Component Functions
  - *1.2.1 Input/Output
  - 1.2.2 Processing
  - 1.2.3 Storage
- *1.3 Terminology
  - 1.3.1 Software
  - 1.3.2 Hardware
  - 1.3.3 Others
- 1.4 Input/Output Methods
- 1.5 Languages
  - *1.5.1 BASIC
  - *1.5.2 COBOL
  - *1.5.3 FORTRAN
  - 1.5.4 Assembler
  - 1.5.5 Others

2.0 Algorithms/Programming

- 2.1 Algorithms
  - *2.1.1 Flowcharts
  - 2.1.2 English language algorithms
- *2.2 Constants/Variables
  - 2.2.1 Numeric
  - 2.2.2 String
- *2.3 Expressions/Formulas
- *2.4 Branching Statements
  - 2.4.1 IF
  - 2.4.2 GOTO
  - 2.4.3 GOSUB
- 2.5 Repetitive Processes
  - 2.5.1 Iterations
  - 2.5.2 FOR loops
- 2.6 Input/Output
  - *2.6.1 READ, DATA
  - *2.6.2 INPUT
  - *2.6.3 PRINT
  - 2.6.4 Formatted PRINT
- 2.7 Subscripted Variables
  - *2.7.1 Single dimension
  - 2.7.2 Multi-dimension
- 2.8 Built-in Functions

3.0 Social Impact

- 3.1 Historical Developments
- *3.2 Appropriate Tasks
- 3.3 Computer Utilization
  - *3.3.1 Storage, retrieval
  - 3.3.2 Simulation, modeling
  - 3.3.3 Process control
  - *3.3.4 Computing
  - *3.3.5 Data processing
- 3.4 Benefits
  - *3.4.1 Speed
  - 3.4.2 Accuracy
  - 3.4.3 Repetitiveness
- 3.5 Employment Opportunities

* Indicates Minimum Level Skill

PERFORMANCE OBJECTIVES
COMPUTER LITERACY

Computer Literacy is a survey course designed to expand computer awareness and literacy. It acquaints students with computer systems, programming in BASIC, and the social impact created by computers. Successful completion of this course is based on teacher judgment and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Computer Systems

*1.1 Students will identify the major components of a computer system.

1.2 Students will identify the functions of each of the following:

- *(1) input/output devices;
- (2) processing units; and
- (3) storage systems.

*1.3 Students will identify common computer terminology associated with the following:

- (1) software;
- (2) hardware; and
- (3) others.

1.4 Students will identify program and data input/output methods.

1.5 Students will identify a primary use for each given computer language:

- *(1) BASIC;
- *(2) COBOL;
- *(3) FORTRAN;

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*Indicates Minimum Level Skill

(4) assembler; and

(5) others.

2.0 Algorithms/Programming

2.1 Students will construct and interpret algorithms designed to solve given problems involving:

*(1) flowcharts; and

(2) English language algorithms.

*2.2 Students will select representation for constants and variables both:

(1) numeric; and

(2) string.

*2.3 Students will write programs to evaluate numeric expressions and formulas.

*2.4 Students will write programs for branching processes using:

(1) IF;

(2) GOTO; and

(3) GOSUB statements.

2.5 Students will write programs utilizing repetitive processes by use of:

(1) iterations; and

(2) FOR loops.

2.6 Students will use correct input/output statements to represent specified data:

*(1) READ, DATA statements;

*(2) INPUT statements;

*(3) PRINT statements; and

(4) formatted PRINT statements.

2.7 Students will write programs for specified problems by use of subscripted variables:

- *(1) single dimensional; and
- (2) multi-dimensional.

2.8 Students will identify the general characteristics of built-in functions.

3.0 Social Impact

3.1 Students will identify the major historical developments in computing.

*3.2 Students will identify tasks for which computer utilization is appropriate.

3.3 Students will discuss computer utilization for the following:

- *(1) information storage and retrieval;
- (2) simulation and modeling;
- (3) process control--decision-making;
- *(4) computing; and
- *(5) data processing.

3.4 Students will list tasks which are enhanced by the computer's:

- *(1) speed;
- (2) accuracy; and
- (3) repetitiveness.

3.5 Students will investigate employment opportunities associated with the use of computers.

INTRODUCTION COMPUTER SCIENCE

State Accreditator Number. .	1501
Course Code Number	1450
F.T.E. Category.	1.10
Instructional Level.	Advanced
Report Card Abbreviation . .	COMP SCI
Length of Course	Year
Credit	1 Math Credit
Grade Level.	10, 11, 12

Prerequisites

Alg II, Math Teacher Recommendation

Textbook(s)

Golden, Neal, *Computer Programming in the BASIC Language* (Atlanta: Harcourt, Brace, Jovanovich, Inc., 1975).

Conway, Richard, *An Introduction to Programming: A Structured Approach* (Cambridge, Massachusetts: Winthrop, 1976).

Notes to Teachers

Students will master the concepts and skills developed for Computer Science as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

Materials relating to high level programming language and algorithm development can be taught best as an integrated whole. The topics should not be covered sequentially. The emphasis of the course should be on techniques of algorithm development and programming with style.

COURSE OUTLINE

CS 2

COMPUTER SCIENCE

- 1.0 Computers and Systems
  - 1.1 Systems Structure
    - *1.1.1 CPU
    - *1.1.2 I/O devices
    - 1.1.3 Storage devices
  - 1.2 Data Representation
    - *1.2.1 Integers
    - 1.2.2 Fixed-point numbers
    - *1.2.3 Floating point numbers
    - 1.2.4 Binary numbers
  - 1.3 Languages: Machine, Assembly
  - 1.4 Compilers
    - *1.4.1 Compiler operations
    - 1.4.2 Procedure-oriented languages
- 2.0 Programming Languages/Programming
  - *2.1 Higher Level Languages: PL/1, FORTRAN, PASCAL
    - 2.1.1 Basic syntax
    - 2.1.2 Semantics
  - *2.2 Integers, Reals, Characters
  - *2.3 Constants, Variables
  - *2.4 Arithmetic Expressions
  - *2.5 Mathematical Expressions
  - *2.6 Assignment Statements
  - *2.7 Logical Expressions
  - 2.8 Repetitive Processes
    - 2.8.1 Loops (DO statements)
    - *2.8.2 Conditionals (IF-THEN-ELSE groups)
  - 2.9 Arrays
  - *2.10 I/O Statements
- 3.0 Algorithms
  - *3.1 Construct Flowcharts
  - 3.2 Types
    - *3.2.1 Direct computation
    - 3.2.2 Enumeration
    - 3.2.3 Divide and conquer
    - *3.2.4 Iteration
    - 3.2.5 Trial and error
  - 3.3 Algorithms: Searching
    - *3.3.1 Linear search
    - 3.3.2 Binary search
  - 3.4 Algorithms: Sorting
    - *3.4.1 Exchange
    - 3.4.2 Insertion
    - 3.4.3 Merge
  - 3.5 Algorithms: Numerical Approximations
    - *3.5.1 Zeros of functions
    - 3.5.2 Monte Carlo techniques
  - 3.6 Algorithms: Statistics
  - *3.7 Algorithms: Application
    - 3.7.1 Business
    - 3.7.2 Science
    - 3.7.3 Engineering
- 4.0 Structured Programming Concepts
  - *4.1 Programming Style
  - 4.2 Documentation
    - 4.2.1 User's manual
    - *4.2.2 Program logic
  - 4.3 Control Flow
    - *4.3.1 Branching
    - 4.3.2 DO loops
    - *4.3.3 IF-THEN-ELSE groups
    - 4.3.4 Subroutines
  - 4.4 Invariant Relation
  - 4.5 Top-down Programming
- 5.0 Debugging/Testing
  - *5.1 Incorrect Expressions
  - *5.2 Incorrect Program Flow
  - 5.3 Failure to Account for Data Cases
  - *5.4 Failure to Initialize Data
  - 5.5 Numerical Errors
  - 5.6 Debugging Software
  - 5.7 Test Data Selection

*Indicates Minimum Level Skills

COMPUTER SCIENCE

- 5.8 Error Detection: Techniques
- 5.9 Program Verification

6.0 String Processing

- 6.1 Concatenation
- 6.2 Substrings

7.0 Computers and Society

- *7.1 Computer History/Technology
- 7.2 The Computer: Modern Society
- 7.3 Computer Applications
- 7.4 The Computer/The Individual
- 7.5 Legal Issues
- 7.6 Privacy/Security
- 7.7 Public Perception: Computers, Computer Scientists
- 7.8 Futurists' Views

PERFORMANCE OBJECTIVES
COMPUTER SCIENCE

Computer Science serves as an introduction to computers and programming. It acquaints students with computer hardware, algorithms, flowcharting, programming languages (PL/1, FORTRAN, PASCAL), and applications. The course content is equivalent to core material used by computer science students at the college level. Successful completion of this course is based on teacher judgment and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Computers and Systems

1.1 Students will list the purposes for the elements of a computer system:

- *(1) central processing unit (CPU);
- *(2) input/output devices; and
- (3) storage devices.

1.2 Students will select the proper data representation for:

- *(1) integers;
- (2) fixed-point numbers;
- *(3) floating-point numbers; and
- (4) binary numbers.

1.3 Students will describe the functions of machine languages and assembly languages.

1.4 Students will identify the main tasks of compilers:

- *(1) compiler operations; and
- (2) procedure-oriented languages.

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* Indicates Minimum Level Skills

2.0 Programming Languages and Programming

*2.1 Students will answer questions relating to the (1) basic syntax and (2) semantics of higher level (problem oriented) programming languages (PL/1, FORTRAN, and PASCAL).

*2.2 Students will give programming language representations for given integers, reals, and characters.

*2.3 Students will represent constants and variables using appropriate programming language.

*2.4 Students will evaluate given arithmetic expressions.

*2.5 Students will translate given mathematical expressions to arithmetic expressions.

*2.6 Students will interpret given assignment statements.

*2.7 Students will use logical expressions to express decision-making in given problems.

2.8 Students will write programs for repetitive processes by use of:

(1) loops (DO statements); and

*(2) conditionals (IF-THEN-ELSE groups).

2.9 Students will manipulate given data by use of arrays.

*2.10 Students will use correct input/output statements to represent specified data.

3.0 Algorithms

*3.1 Students will construct flowcharts to express algorithms designed to solve given problems.

3.2 Students will give examples of each of the following types of algorithms:

*(1) direct computation;

(2) enumeration;

(3) divide and conquer;

*(4) iteration; and

(5) trial and error.

3.3 Students will design programs for searching by use of algorithms for:

*(1) linear search; and

(2) binary search.

3.4 Students will design programs for sorting by use of algorithms for:

*(1) exchange;

(2) insertion; and

(3) merge.

3.5 Students will design programs for numerical approximation by use of algorithms for:

*(1) zeros of functions; and

(2) Monte Carlo techniques.

3.6 Students will design programs for statistics by use of algorithms for measures of central tendency and dispersion.

*3.7 Students will design algorithms for simple (1) business, (2) scientific, and (3) engineering applications involving data manipulation and numerical calculations.

4.0 Structured Programming Concepts

*4.1 Students will prepare readable, understandable, modifiable, and verifiable programs for specified problems.

4.2 Students will write program documentations which will include:

(1) user's manual; and

*(2) program logic.

4.3 Students will write programs which demonstrate correct control flow by use of:

*(1) branching;

(2) DO loops;

*(3) IF-THEN-ELSE groups; and

(4) subroutines.

4.4 Students will write programs which demonstrate the invariant relation of a loop by use of DO WHILE statements.

4.5 Students will write programs which demonstrate top-down programming.

5.0 Debugging and Testing

*5.1 Students will locate incorrect expressions in given programs.

*5.2 Students will locate incorrect program flow in given programs.

5.3 Students will identify failure to account for cases of data for given programs.

*5.4 Students will identify failure to initialize data properly for given programs.

5.5 Students will locate numerical errors in given programs.

5.6 Students will debug programs by using program debugging software.

5.7 Students will select the correct test data for use in given programs.

5.8 Students will give examples for techniques of error detection.

5.9 Students will give examples for specified program verifications.

6.0 String Processing

6.1 Students will use the correct concatenation process to obtain specified output.

6.2 Students will write programs which demonstrate the use of substrings.

7.0 Computers and Society

*7.1 Students will identify major events in the history of computing and technology.

7.2 Students will discuss the place of the computer in modern society.

7.3 Students will investigate various computer applications.

7.4 Students will discuss issues that reflect relations between the computer and the individual.

7.5 Students will discuss legal issues concerning the use of computers.

7.6 Students will discuss issues concerning privacy and security in the use of computers.

7.7 Students will evaluate public perception of computers and computer scientists.

7.8 Students will discuss futurists' views of computing.

INTRODUCTION
CONTEMPORARY MATH

State Accreditator Number. .	2213
Course Code Number	1422
F.T.E. Category.	1.00
Instructional Level.	Standard

Report Card Abbreviation . .	CONTEMP MATH
Length of Course	Year
Credit	1 Math Credit
Grade Level.	9

Prerequisites

Math Teacher Recommendation/Mastery of 8th Grade Standard Skills

Textbook(s)

Keedy, Mervin L., et al, General Mathematics (Menlo Park, California: Addison-Wesley, 1980).

Supplementary Materials

Computational Skills in Mathematics (New Rochelle, New York: Pathescope Educational Media, Inc., 1976).

Gladstone, David and Joseph R. Gladstone, Math Problem Solving 2 (Santa Monica, California: BFA, 1979).

Gladstone, David and Joseph Gladstone, Computational Skill Laboratory 2 (Santa Monica, California: BFA, 1976).

Gladstone, David and Joseph R. Gladstone, Math Problem Solving 3 (Santa Monica, California: BFA, 1980).

Individualized Computational Skills Program (Boston: Houghton Mifflin Company, 1972).

Marcy, Janis and Steve Marcy, Pre-Algebra with Pizzazz (Palo Alto, California: Creative Publications, 1978).

Note to Teachers

Student will master the concepts and skills developed for Contemporary Mathematics as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLST) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

Stanford Achievement objectives are indicated by the symbol #.

COURSE OUTLINE

CM 3

CONTEMPORARY MATH

1.0 Whole Numbers/Decimal Fractions: Sums/Applications

- 1.1 Use Numbers
  - 1.1.1 Dates
  - 1.1.2 Time notation
- 1.2 Use Place Value
- δ 1.3 Read/Write
  - # 1.3.1 Whole numbers
  - 1.3.2 Money values
  - 1.3.3 Decimal fractions
- 1.4 Add
  - δ 1.4.1 Four 6-digit whole numbers
  - δ*1.4.2 Four decimal fractions: no more than three decimal places
  - 1.4.3 Money
- 1.5 Apply Consumer Skills
  - 1.5.1 Checks
  - 1.5.2 Deposit slips
- δ 1.6 Solve Word Problems
- #δ 1.7 Round
- 1.8 Estimate Sums
- 1.9 Use Math in Careers: Agricultural Pilot

2.0 Whole Numbers/Decimal Fractions: Differences/Applications

- 2.1 Subtract
  - #δ 2.1.1 6-digit whole numbers
  - δ*2.1.2 Decimal fractions: no more than three decimal places
  - 2.1.3 Money
- 2.2 Apply Consumer Skills
  - 2.2.1 Running balance
  - 2.2.2 Monthly statements
- 2.3 Compare Decimal Fractions
- 2.4 Estimate Differences
- 2.5 Solve Word Problems
- 2.6 Use Math in Careers: Worm Farming

3.0 Whole Numbers/Decimal Fractions: Products/Applications

- 3.1 Multiply
  - 3.1.1 Whole number by 1-digit whole number
  - # *3.1.2 Whole number by 2-digit whole number
  - δ 3.1.3 Whole number by 3-digit whole number
  - # 3.1.4 Whole number by decimal fraction
  - #δ*3.1.5 Two decimal fractions
  - 3.1.6 Whole number/ Decimal fraction by powers of 10
  - 3.1.7 Money
- 3.2 Apply Consumer Skills
  - 3.2.1 Money
  - # 3.2.2 Change
- 3.3 Estimate Products
- 3.4 Solve Word Problems
- 3.5 Use Math in Careers: Fast Food Restaurant Manager

4.0 Whole Numbers/Decimal Fractions: Quotients/Applications

- 4.1 Divide
  - # 4.1.1 Whole number by 1-digit whole number
  - #δ*4.1.2 Whole number by 2-digit whole number
  - # 4.1.3 Whole number by 3-digit whole number
  - *4.1.4 Decimal fraction by 2-digit whole number

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* Indicates Minimum Level Skills Test
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

CONTEMPORARY MATH

- #δ 4.1.5 Decimal fraction by decimal fraction
- 4.1.6 Whole number/ Decimal fraction by powers of 10
- 4.1.7 Money
- 4.2 Apply Consumer Skills
  - 4.2.1 Rates/Wages
  - 4.2.2 Job/Flat rate
- # 4.3 Estimate Quotients
- 4.4 Round Quotients
- 4.5 Solve Word Problems
- 4.6 Use Math in Careers: Maintenance Service

5.0 Fractions: Basic Skills/ Applications

- 5.1 Identify Shaded Part
- 5.2 Compare Fractions
- 5.3 Convert
  - #δ 5.3.1 Decimal fractions to fractions
  - δ*5.3.2 Fractions to decimal fractions
  - δ 5.3.3 Mixed numbers to fractions
  - δ 5.3.4 Fractions to mixed numbers
  - # 5.3.5 Decimal fractions to mixed numbers
  - 5.3.6 Mixed numbers to decimal fractions
- 5.4 Apply Consumer Skills
  - 5.4.1 Time measurement
  - 5.4.2 Time zones
- 5.5 Use Math in Careers: Operations Manager

6.0 Fractions: Products/Quotients/ Applications

- 6.1 Find Equivalent Fractions
- 6.2 Simplify Fractions
- # 6.3 Multiply
  - 6.3.1 Two fractions
  - 6.3.2 Proper fraction/ Whole number
  - δ 6.3.3 Whole number/ Mixed number
  - *6.3.4 Two mixed numbers
- 6.4 State Reciprocal
- 6.5 Divide
  - 6.5.1 Two fractions
  - 6.5.2 Fraction by whole number
  - 6.5.3 Whole number by fraction
  - 6.5.4 Whole number by mixed number
  - *6.5.5 Mixed number by whole number
  - # 6.5.6 Mixed number by fraction
  - 6.5.7 Two mixed numbers
- 6.6 Apply Consumer Skills
  - 6.6.1 Budget
  - 6.6.2 Food/Nutrition
- 6.7 Use Math in Careers: Home Economist

7.0 Fractions: Sums/Differences/ Applications

- 7.1 Compute Least Common Denominator
- 7.2 Add
  - 7.2.1 Proper fractions: common denominator in problem
  - 7.2.2 Proper fractions
  - #δ*7.2.3 Mixed numbers
- # 7.3 Subtract
  - 7.3.1 Proper fractions: common denominator in problem
  - 7.3.2 Proper fractions
  - *7.3.3 Mixed numbers
  - δ 7.3.4 Mixed numbers/ Whole numbers

CONTEMPORARY MATH

- 7.4 Apply Consumer Skills
  - 7.4.1 Food values
  - 7.4.2 Household problems
- 7.5 Use Math in Careers: Van Customizing

8.0 Ratio/Proportion

- 8.1 Express Ratio as Fraction
- 8.2 Compute Unit Rate
- 8.3 Find Cross Product
- 8.4 Solve Proportion Problems
  - 8.4.1 Real-world problems
  - 8.4.2 Similar figures
- 8.5 Apply Consumer Skills
  - 8.5.1 Comparison shopping
  - 8.5.2 Catalog shopping
- 8.6 Use Math in Careers: Merchandising

9.0 Percent

- *9.1 Convert
  - 9.1.1 Percents to decimal fractions
  - 9.1.2 Decimal fractions to percents
  - 9.1.3 Percents to fractions
  - 9.1.4 Fractions to percents
- # 9.2 Solve Percent Problems
  - 9.2.1 a% of b = ______
  - 9.2.2 ___% of b = c
  - 9.2.3 a% of ______ = c
- 9.3 Compute Percent of Increase/Decrease
- 9.4 Apply Consumer Skills
  - 9.4.1 Commissions/Tips
  - 9.4.2 Sale items
- 9.5 Use Math in Careers: Beautician

10.0 Measurement

- 10.1 Use Metric Prefixes
- 10.2 Convert within Metric System
  - 10.2.1 Length
  - 10.2.2 Capacity
  - 10.2.3 Weight
- 10.3 Determine Temperature Scale
- 10.4 Convert within English System
  - 10.4.1 Length
  - 10.4.2 Capacity
  - 10.4.3 Weight
- 10.5 Measure Angles
- 10.6 Apply Consumer Skills
  - 10.6.1 Time schedules
  - 10.6.2 Rate schedules
- 10.7 Use Math in Careers: Civil Service

11.0 Perimeter/Area

- 11.1 Compute Perimeter/Circumference
  - # 11.1.1 Polygons
  - *11.1.2 Real-world problems: rectangles
  - 11.1.3 Circles
- 11.2 Compute Area
  - # 11.2.1 Quadrilaterals
  - 11.2.2 Triangles
  - # *11.2.3 Real-world problems: rectangles
  - 11.2.4 Circles
- 11.3 Apply Consumer Skills
  - 11.3.1 Apartment rental
  - 11.3.2 Home purchase
- 11.4 Solve Word Problems
- 11.5 Use Math in Careers: Architect

CONTEMPORARY MATH

12.0 Volume

- 12.1 Compute Volume
  - # 12.1.1 Rectangular prisms
  - 12.1.2 Cylinders
  - 12.1.3 Pyramids
  - 12.1.4 Cones
  - 12.1.5 Spheres
- 12.2 Apply Consumer Skills
  - 12.2.1 Energy bills
  - 12.2.2 Energy conservation
- 12.3 Use Math in Careers: Oceanographer

13.0 Graphing/Statistics

- # 13.1 Graph Ordered Pairs
- 13.2 Draw
  - 13.2.1 Line graphs
  - 13.2.2 Bar graphs
  - 12.2.3 Circle graphs
- 13.3 Compute
  - # 13.3.1 Mean
  - 13.3.2 Median
  - ó 13.3.3 Mode
- 13.4 Apply Consumer Skills
  - 13.4.1 Travel costs
  - 13.4.2 Sports statistics
- 13.5 Use Math in Careers: Advertising Layout Artist

14.0 Positive/Negative Numbers

- 14.1 Compare
- # 14.2 Add
- # 14.3 Subtract
- # 14.4 Multiply
- # 14.5 Divide
- 14.6 Apply Consumer Skills
  - 14.6.1 Charts
  - # 14.6.2 Maps
- 14.7 Use Math in Careers: Well Driller

15.0 Expressions/Equations

- 15.1 Evaluate Variable Expressions
- # 15.2 Solve Equations: One Variable
  - 15.2.1 Addition principle
  - 15.2.2 Multiplication principle
  - 15.2.3 Addition/ Multiplication combined
- # 15.3 Solve Word Problems
- 15.4 Graph Equations
- 15.5 Apply Consumer Skills
  - 15.5.1 Interest
  - 15.5.2 Credit costs
- 15.6 Use Math in Careers: Optometrist

PERFORMANCE OBJECTIVES
CONTEMPORARY MATH

Contemporary Math is designed to strengthen basic mathemathics skills, to develop those concepts which are necessary for daily living, and to stimulate the desire for further studies in mathematics. It provides for the development of those skills necessary for success in algebra and at the same time places emphasis on the practical uses of mathematics. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Whole Numbers and Decimal Fractions: Sums and Applications

- 1.1 Students will use numbers to write:
    - (1) dates in three ways; and
    - (2) time notation.
- 1.2 Students will use place value to find the value of a designated digit.
- δ 1.3 Students will read and write:
    - # (1) whole numbers through billions;
    - (2) money values; and
    - (3) decimal fractions through thousandths.
- 1.4 Students will add:
    - δ (1) up to and including four 6-digit whole numbers;
    - δ*(2) four decimal fractions with no more than three decimal places in each; and
    - (3) money values.

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* Indicates Minimum Level Skills
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

1.5 Students will apply consumer skills to:

(1) writing checks; and

(2) making deposit slips.

δ 1.6 Students will solve word problems involving the addition of whole numbers or decimal fractions.

#δ 1.7 Students will round whole numbers and decimal fractions to any designated place.

1.8 Students will estimate the sums of whole numbers and decimal fractions.

1.9 Students will use math skills in solving the real-world problems of an agricultural pilot.

2.0 Whole Numbers and Decimal Fractions: Differences and Applications

2.1 Students will subtract:

#δ (1) up to and including two six-digit whole numbers;

δ*(2) decimal fractions with no more than three decimal places in each, regrouping required; and

(3) money values.

2.2 Students will apply consumer skills to:

(1) keeping a running balance; and

(2) reconciling monthly statements.

2.3 Students will compare decimal fractions using =, <, or >.

2.4 Students will estimate differences of whole numbers and decimal fractions.

2.5 Students will solve word problems involving the subtraction of whole numbers or decimal fractions.

2.6 Students will use math skills in solving the real-world problems of worm farming.

3.0 Whole Numbers and Decimal Fractions: Products and Applications

3.1 Students will multiply:

(1) any whole number by a one-digit whole number;

# *(2) a four-digit whole number by a two-digit whole number;

δ (3) a four-digit whole number by a three-digit whole number;

(4) a four-digit whole number by a decimal fraction;

#δ*(5) two decimal fractions with no more than three decimal places in each;

(6) a whole number or decimal fraction by powers of 10; and

(7) money values.

3.2 Students will apply consumer skills to:

(1) counting money; and

(2) receiving and giving change.

3.3 Students will estimate products of whole numbers and decimal fractions.

3.4 Students will solve word problems involving the addition and multiplication of whole numbers or decimal fractions.

3.5 Students will use math skills in solving the real-world problems of a fast food restaurant manager.

4.0 Whole Numbers and Decimal Fractions: Quotients and Applications

4.1 Students will divide:

(1) any whole number by a one-digit whole number;

#δ*(2) a four-digit whole number by a two-digit whole number, no remainder;

(3) a five-digit whole number by a three-digit whole number;

*(4) a decimal fraction with no more than three decimal places by a two-digit whole number, no remainder;

#ó (5) a decimal fraction by a decimal fraction;

(6) a whole number or decimal fraction by powers of 10; and

(7) money values.

4.2 Students will apply consumer skills to:

(1) computing rates and wages; and

(2) job and flat rate problems.

# 4.3 Students will estimate quotients of whole numbers and decimal fractions.

4.4 Students will round quotients to designated places.

4.5 Students will solve word problems involving multiplication and division of whole numbers or decimal fractions.

4.6 Students will use math skills in solving the real-world problems of maintenance service.

5.0 Fractions: Basic Skills and Applications

5.1 Students will identify what part of a figure is shaded.

5.2 Students will compare fractions using > or < .

5.3 Students will convert:

#ó (1) one-, two-, or three- place decimal fractions to fractions;

ó*(2) proper fractions with denominators of 2,4,5,10,20, 25,50, and 100 to decimal fractions;

ó (3) mixed numbers to improper fractions;

ó (4) improper fractions to mixed numbers;

# (5) one-, two-, or three- place decimal fractions to mixed numbers; and

(6) mixed numbers to decimal fractions.

5.4 Students will apply consumer skills to problems involving:

(1) time measurement; and

(2) time zones.

5.5 Students will use math skills in solving the real-world problems of an operations manager.

6.0 Fractions: Products, Quotients, and Applications

6.1 Students will find fractions equivalent to given fractions.

6.2 Students will simplify fractions to lowest terms.

6.3 Students will multiply:

(1) two fractions;

(2) a proper fraction and a whole number;

ȯ (3) a whole number and a mixed number; and

*(4) two mixed numbers.

6.4 Students will state the reciprocal of a given positive number.

6.5 Students will divide:

(1) two fractions;

(2) a fraction by a whole number;

(3) a whole number by a fraction;

(4) a whole number by a mixed number;

*(5) a mixed number by a one-digit whole number;

# (6) a mixed number by a fraction; and

(7) two mixed numbers.

6.6 Students will apply consumer skills to problems involving:

(1) a budget; and

(2) food and nutrition.

6.7 Students will use math skills in solving the real-world problems of a home economist.

7.0 Fractions: Sums, Differences, and Applications

7.1 Students will compute the least common denominator of no more than three proper fractions.

7.2 Students will add:

(1) proper fractions with common denominator in the problem;

(2) proper fractions; and

#δ*(3) two mixed numbers with denominators of 2,3,4,5,6, 8,10, and 16 with common denominator in the problem, regrouping required.

# 7.3 Students will subtract:

(1) proper fractions with common denominator in the problem;

(2) proper fractions;

*(3) two mixed numbers with denominators of 2,3,4,5,6, 8,10, and 16 with common denominator in the problem, regrouping required; and

δ (4) mixed numbers and whole numbers.

7.4 Students will apply consumer skills to:

(1) computing food values; and

(2) solving household problems.

7.5 Students will use math skills in solving the real-world problems of customizing a van.

8.0 Ratio and Proportion

8.1 Students will express a ratio as an equivalent fraction.

8.2 Students will compute unit rate using information given in real-world problems.

8.3 Students will find the cross product.

8.4 Students will solve proportion problems using information given in:

   (1) real-world problems; and

   (2) similar figures.

8.5 Students will apply consumer skills to problems involving:

   (1) comparison shopping; and

   (2) catalog shopping.

8.6 Students will use math skills in solving the real-world problems of merchandising.

9.0 Percent

ó*9.1 Students will convert:

   (1) percents to decimal fractions;

   (2) one-, two-, or three- place decimal fractions to percents;

   (3) whole number percents to fractions; and

   (4) fractions with denominators of 2,4,5,10,20,25,50, and 100 to percents.

# 9.2 Students will solve the three types of percent problems including:

   ó (1) a% of b = ________;

   (2) _____ % of b = c; and

   (3) a% of_______ = c.

9.3 Students will compute the percent of increase or decrease between two numbers.

9.4 Students will apply consumer skills to:

(1) working for commissions and tips; and

(2) buying items on sale.

9.5 Students will use math skills in solving the real-world problems of a beautician.

10.0 Measurement

10.1 Students will use the metric prefixes.

10.2 Students will convert between units within the metric system to solve problems involving:

(1) length;

(2) capacity; and

(3) weight.

10.3 Students will determine from given data if the Celsius or Fahrenheit temperature scale has been used.

10.4 Students will convert between units within the English system to solve problems involving:

(1) length;

(2) capacity; and

(3) weight.

10.5 Students will measure angles using a protractor.

10.6 Students will apply consumer skills to problems involving:

(1) time schedules; and

(2) rate schedules.

10.7 Students will use math skills in solving the real-world problems of a civil service employee.

11.0 Perimeter and Area

11.1 Students will compute the perimeter/circumference, using metric or English units, of:

- # (1) polygons when given a labeled figure;
- *(2) rectangles when given real-world problems; and
- (3) circles when given a labeled figure.

11.2 Students will compute the area, using metric or English units, of:

- # (1) quadrilaterals when given a labeled figure;
- (2) triangles when given a labeled figure;
- # *(3) rectangles when given real-world problems; and
- (4) circles when given a labeled figure.

11.3 Students will apply consumer skills to:

- (1) renting an apartment; and
- (2) purchasing a home.

11.4 Students will solve word problems by applying the perimeter and area formulas.

11.5 Students will use math skills in solving the real-world problems of an architect.

12.0 Volume

12.1 Students will compute the volume, using metric or English units, when given a labeled figure of:

- # (1) rectangular prisms;
- (2) cylinders;
- (3) pyramids;
- (4) cones; and
- (5) spheres.

12.2 Students will apply consumer skills to problems involving:

(1) energy bills; and

(2) energy conservation.

12.3 Students will use math skills in solving the real-world problems of an oceanographer.

13.0 Graphing and Statistics

# 13.1 Students will graph ordered pairs in the first quadrant.

13.2 Students will draw from data when given in a table:

(1) line graphs;

(2) bar graphs; and

(3) circle graphs.

13.3 Students will compute the:

# (1) mean;

(2) median; and

(3) mode.

13.4 Students will apply consumer skills to problems involving:

(1) travel costs; and

(2) sports statistics.

13.5 Students will use math skills in solving the real-world problems of an advertising layout artist.

14.0 Positive and Negative Numbers

14.1 Students will compare integers using <, > or = .

# 14.2 Students will add integers.

# 14.3 Students will subtract integers.

# 14.4 Students will multiply integers.

# 14.5 Students will divide integers.

14.6 Students will apply consumer skills to reading:

(1) charts; and

# (2) maps.

14.7 Students will use math skills in solving the real-world problems of a well driller.

15.0 Expressions and Equations

15.1 Students will evaluate variable expressions when given the values of the variables.

# 15.2 Students will solve equations in one variable by using the:

(1) addition principle;

(2) multiplication principle; and

(3) both addition and multiplication principles.

# 15.3 Students will solve word problems by translating the problem to an equation in one variable.

15.4 Students will graph equations in two variables on a coordinate plane.

15.5 Students will apply consumer skills to problems involving:

(1) interest; and

(2) credit costs.

15.6 Students will use math skills in solving the real-world problems of an optometrist.

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
1.0	WHOLE NUMBERS/ DECIMAL FRACTIONS:SUMS/ APPLICATIONS	3 weeks									
1.1	Use Numbers										
1)	Dates			4-5	1						
2)	Time notation			4-5	1						
1.2	Use Place Value			6-7,12-13, 20-21,34,35		D2(1-6)					
1.3	Read/Write		SSAP								
1)	Whole numbers		SAT	12-13							
2)	Money values			8-9,34	2						
3)	Decimal fractions			20,21		D1(1-4)	D1				

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
1.4	Add										
1)	Four 6-digit whole numbers		SSAP	14-17,34,35, 128,274	3,4		W+	1-7, 9-12,15			
2)	Four decimal fractions: no more than three decimal places		MLST SSAP	22-23,35, 128,274	5	D3	D6,8	91-95			G97-100
3)	Money			14-17				8,15			
1.5	Apply Consumer Skills										
1)	Checks			10-11							
2)	Deposit slips			18-19							
1.6	Solve Word Problems		SSAP	24-25	6				1,3,5, 9,13, 17,21, 25,29, 33,37, 105,109	1,7,13, 31,37, 43	G1-6 B3-4

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
1.7	Round		SSAP SAT	26-27		D7	D5				B13
1.8	Estimate Sums			28-29,35,128	7						
1.9	Use Math in Careers: Agricultural Pilot			30-31							
2.0	WHOLE NUMBERS/ DECIMAL FRACTIONS: DIFFERENCES/ APPLICATIONS	2 weeks									
2.1	Subtract										
1)	6-digit whole numbers		SSAP SAT	40-45,62,129, 274	9 10		W-	16-20, 22-28			G4,7,9, B5,7,9
2)	Decimal fractions: no more than three decimal places		MLST SSAP	50-51,63,129, 274	12 14	D4	D7,9	96-100			G101-104
3)	Money			40-45				21			

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
				County Adopted General Mathematics		Supplementary Instructional Materials					
Number	Topic	Teaching Time	Tested On	TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
2.2	Apply Consumer Skills										
1)	Running balance			46-47							
2)	Monthly statements			52-53							
2.3	Compare Decimal Fractions			48-49,63	11	D2(7-8)					
2.4	Estimate Differences			54-55,63, 129							
2.5	Solve Word Problems			56-57	13				2,3,6, 10,14, 18,22, 26,30, 34,38 41,42, 106,110	2,8,14, 32,38, 44	G8-10 B7-10
2.6	Use Math in Careers: Worm Farming			58-59							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
				County Adopted *General Mathematics*		Supplementary Instructional Materials					
Number	Topic	Teaching Time	Tested On	TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
3.0	WHOLE NUMBERS/ DECIMAL FRACTIONS: PRODUCTS/ APPLICATIONS	2 weeks									
3.1	Multiply										
1)	Whole number by 1-digit whole number			68-69,92,130, 275	15		Wx(1-5)	29-35			
2)	Whole number by 2-digit whole number		MLST SAT	70-71,92,130, 275	16		Wx(6,9, 10)	37-42			
3)	Whole number by 3-digit whole number		SSAP	72,73,92,130, 275	17		Wx(7,8, 11,12)	43			
4)	Whole number by decimal fraction		SAT	82-83,93,130, 275	19		D10(3)	101-102, 104			G107

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
5)	Two decimal fractions		MLST SSAP SAT	82-83,93,130, 275	19	D5	D10(4-5)	103, 105-109			G108-114
6)	Whole number/ Decimal fraction by powers of 10			84-85,93,131		D6	D10(1-2)	36			
7)	Money			68-73							
3.2	Apply Consumer Skills										
1)	Money			74-75							
2)	Change		SAT	80-81							
3.3	Estimate Products			76-79,92,93, 130,131	18						B14 P144

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
3.4	Solve Word Problems			86-87	20				45,49, 53,57, 61,65, 69,73 77,81 85,89, 93,97, 101, 113,138	19,103	G16-18 B11-12
3.5	Use Math in Careers: Fast Food Restaurant Manager			88-89							
4.0	WHOLE NUMBERS/ DECIMAL FRACTIONS: QUOTIENTS/ APPLICATIONS	3 weeks									

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
				County Adopted General Mathematics		Supplementary Instructional Materials					
Number	Topic	Teaching Time	Tested On	TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
4.1	Divide										
1)	Whole number by 1-digit whole number		SAT	98-101,126, 131,275	22		W÷(1-4)	46-51, 118			
2)	Whole number by 2-digit whole number		MLST SSAP SAT	102-103,126, 131,275	23		W÷(5-6)	55-56			
3)	Whole number by 3-digit whole number		SAT	104-105,126, 132,275	24		W÷(7-9)	57-59			
4)	Decimal fraction by 2-digit whole number		MLST	108-109,127, 132,275	25	D8	D11 (1-2)	110-112 113-114			G117,118
5)	Decimal fraction by decimal fraction		SSAP SAT	116-117,127, 132,275	27	D9	D11 (3-6)	116-117			G119-128

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources								
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials						
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
6)	Whole number/ Decimal fraction by powers of 10			110-111,127, 132,275				52-54, 115			
7)	Money			100-101,112, 113							
4.2	Apply Consumer Skills										
1)	Rates/Wages			106-107							
2)	Job/Flat rate			114-115							
4.3	Estimate Quotients		SAT	112-113,127, 132,275	26						
4.4	Round Quotients			118-119,127, 132,275	28						

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
4.5	Solve Word Problems			120-121	29				45,50, 54,58, 62,66 70,74 78,82, 86,90, 94,98, 102,114, 139	20,104	G20-24 B15-20
4.6	Use Math in Careers: Maintenance Service			122-123							
5.0	FRACTIONS:BASIC SKILLS/ APPLICATIONS	3 weeks									
5.1	Identify Shaded Part			136-137,162, 276	31	F1		60			
5.2	Compare Fractions			138-143,162	32						

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
5.3	Convert										
1)	Decimal fractions to fractions		SSAP SAT	144-145,162, 276	33	D1(9-10)	D3	83,85,86			
2)	Fractions to decimal fractions		MLST SSAP	146-147,162, 163	34 36	D1(5-8) D10	D2	82,87, 88,119, 120			
3)	Mixed numbers to fractions		SSAP	150-151,163, 276		F3(5-6)	FBS 15 (1-2)	67			
4)	Fractions to mixed numbers		SSAP	152-153,163,	35	F3(2-3)	FBS 15 (3-4)	68			
5)	Decimal fractions to mixed numbers		SAT	154-155,163, 276				89,90			
6)	Mixed numbers to decimal fractions			154-155,163, 276			D4	84,87, 88			
5.4	Apply Consumer Skills										
1)	Time measurement			148-149							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
2)	Time zones			156-157							
5.5	Use Math in Careers: Operations Manager			158-159							
6.0	FRACTIONS: PRODUCTS/ QUOTIENTS/ APPLICATIONS	2 weeks									
6.1	Find Equivalent Fractions			170-171,190	38	F2(1-3)	FBS 9,10 P1	61,62			G32,33 B30
6.2	Simplify Fractions			172-173, 190,358		F2(4-6)	FBS 11,12	63,72			G34 B26,27
6.3	Multiply		SAT								
1)	Two fractions		SAT	168-169, 174,175, 190,276,358	37 A	F7(1-2)	Fx1,2	77			G31,35 G36 B25,28, 29

CM 29

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
				County Adopted *General Mathematics*		Supplementary Instructional Materials					
Number	Topic	Teaching Time	Tested On	TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
2)	Proper fraction/ Whole number		SAT	168-169,174, 175,190,276, 358	37 B 39	F7(3-4)	Fx3	76			
3)	Whole number/ Mixed number		SSAP SAT	176-177,191, 277,358		F8(1)	Fx4				G37,38
4)	Two mixed numbers		MLST SAT	176-177,191, 277,358	40 A	F8(2-3)	Fx5	78			G39 B31,32
6.4	State Reciprocal			180-181,191, 277,358							G55
6.5	Divide										
1)	Two fractions			180-181,191, 277,358	40 B	F9(1,4)	F÷3	79			G61,62 G63,64
2)	Fraction by whole number			180-181,191, 277 358		F9(3)	F÷5 (1,2)				G59,60
3)	Whole number by fraction			180-181,191, 277,358		F9(2)	F÷1,2				G57,58

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
				County Adopted General Mathematics		Supplementary Instructional Materials					
Number	Topic	Teaching Time	Tested On	TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
4)	Whole number by mixed number			182-183,191, 277,358		F10 (1-2)	F÷6 (2,4,6)				G67,68
5)	Mixed number by whole number		MLST	182-183,191, 277,358		F10 (1-2)	F÷5(3)				G67,68 B34,35 B36
6)	Mixed number by fraction		SAT	182-183,191, 277,358		F10 (1-2)	F÷4	80			G69,70 B33
7)	Two mixed numbers			182-183,191, 277,358	41 42	F10 (1-4)	F÷6 (1,3,5, 7,8				G71,72 G73,74
6.6	Apply Consumer Skills										
1)	Budget			178-179							
2)	Food/Nutrition			184-185							
6.7	Use Math in Careers: Home Economist			186-187							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
				County Adopted *General Mathematics*		Supplementary Instructional Materials					
Number	Topic	Teaching Time	Tested On	TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
7.0	FRACTIONS:SUMS/ DIFFERENCES/ APPLICATIONS	2 weeks									
7.1	Compute Least Common Denominator			198,199,218, 277,358	44		FBS 14	64			G45,46 B39,40
7.2	Add										
1)	Proper fractions: common denominator in problem			196-197,218, 277,358	43	F4(1-2)	F+1,2	65			G29,43
2)	Proper fractions			200-201,218, 277,358	45	F5(1-3)	F+4	69			G47-48 B41,42
3)	Mixed numbers		MLST SSAP SAT	202-203,218, 277,358	46	F4(4-6) F5(4-6)	F+2,3, 5	71,73			G49-51 B43,44

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
7.3	Subtract		SAT								
1)	Proper fractions: common denominator in problem		SAT	206-207,219, 277,358		F4(3)	F-1	66			G37,38
2)	Proper fractions		SAT	206-207,219, 277,358	47 A		F-5	70			
3)	Mixed numbers		MLST SAT	208-209,219, 278,358	47 B	F6(1,3, 5)	F-2,4, 6	75			B43,44
4)	Mixed numbers/ Whole numbers		SSAP SAT	210-211,219, 278,358	48 49	F6(4)	F-3	74			G49-51
7.4.	Apply Consumer Skills										
1)	Food values			204-205							
2)	Household Problems			212-213							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
				County Adopted *General Mathematics*		Supplementary Instructional Materials					
Number	Topic	Teaching Time	Tested On	TEXT	MPF	CSM	ICSP	PIZZAZZ	MPS 2	MPS 3	Spectrum
7.5	Use Math in Careers: Van Customizing			214-215							
8.0	RATIO/ PROPORTION	2 weeks									
8.1	Express Ratio as Fraction			224-225,242, 278				BB29			P51
8.2	Compute Unit Rate			226-227,242, 278	50						
8.3	Find Cross Product			230-231,242, 278,359	51			BB30,32			P52,53
8.4	Solve Proportion Problems										
1)	Real-world problems			232-233,243, 278,359	52 53			BB31		109-111	P54-56
2)	Similar figures			234-235,243				CC22			P96-98

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KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
8.5	Apply Consumer Skills										
1)	Comparison shopping			228-229							
2)	Catalog shopping			236-237							
8.6	Using Math in Careers: Merchandising			238-239							
9.0	PERCENT	3 weeks									
9.1	Convert		MLST SSAP								
1)	Percents to decimal fractions		MLST	248-249,272, 279	54	P3	P7	123			G131, 133,134, P57,59, 60
2)	Decimal fractions to percents		MLST	248-249,272, 279	54	P4	P5	124			G133,134 P59,60

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
3)	Percents to fractions		MLST	250-251,272, 279	55	P2	P6	122			G132 P57,58, 60
4)	Fractions to percents		MLST	252-253,272, 279	56	P5	P2,3,4				G132 P58,60
9.2	Solve Percent Problems		SAT								
1)	a% of b=______		SSAP	254-257,273, 279,359	57	P6,7,8	P8	125		61-63, 67-69, 115-117, 121-123	G135-138 P61,62 67,68
2)	___% of b= c			254-255,258, 259,273,279, 359	58	P9	P9				P63,67, 68
3)	a % of___= c			254-255,262, 263,273,279, 359	59	P10	P10			145	P65-68
9.3	Compute Percent of Inrease/ Decrease			264-265							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
				County Adopted General Mathematics		Supplementary Instructional Materials					
Number	Topic	Teaching Time	Tested On	TEXT	MPF	CSM	ICSP	CSL 2	MPS 2	MPS 3	Spectrum
9.4	Apply Consumer Skills										
1)	Commissions/ Tips			260-261							
2)	Sale items			266-267							
9.5	Use Math in Careers: Beautician			268-269							
10.0	MEASUREMENT	2 weeks									
10.1	Use Metric Prefixes			284-285,306, 360	62						
10.2	Convert within Metric System										
1)	Length			286-287,306, 444							P129,130

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	PIZZAZZ	MPS 2	MPS 3	Spectrum
2)	Capacity			290-291,306, 360,444	63						
3)	Weight			292-293,306, 360,444	64			CC24-26			
10.3	Determine Temperature Scale			296-297							P45,46
10.4	Convert within English System										
1)	Length			298-299,307, 360,444	65						G77-80 P127-128
2)	Capacity			298-299,307, 360,444	65						G77,78 P131,132
3)	Weight			298-299,307 360,444	65						P131,132
10.5	Measure Angles			300-301,307							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	PIZZAZZ	MPS 2	MPS 3	Spectrum
10.6	Apply Consumer Skills										
1)	Time schedules			288-289							G77-80 P131,132
2)	Rate schedules			294-295							
10.7	Use Math in Careers: Civil Service			302-303							
11.0	PERIMETER/AREA	2 weeks									
11.1	Compute Perimeter/ Circumference										
1)	Polygons		SAT	312-313, 334,361,444	67			CC27-29			P111
2)	Real-world problems: rectangles		MLST	328-329	71			CC27 DD44	121,124, 125,128, 130	73, 75-78	
3)	Circles			314-315, 334,361,444	68			CC30,31			P112

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted *General Mathematics*		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	PIZZAZZ	MPS 2	MPS 3	Spectrum
11.2	Compute Area										
1)	Quadrilaterals		SAT	318-323,334, 335,362,445	69			CC35-37			G81 P113,116,117
2)	Triangles			318-323,334, 335,362,445	70			CC38,39			G83,84 P114
3)	Real-world problems: rectangles		MLST SAT	328-329	71			CC37	122,124, 126,128	74-78	G82 P118
4)	Circles			326-327,335, 362,445				CC40,41			P115
11.3	Apply Consumer Skills										
1)	Apartment rental			316-317							
2)	Home purchase			324-329							
11.4	Solve word problems			328-329	71				121,122, 125,126, 129,130	73-75, 79-81, 127	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	PIZZAZZ	MPS 2	MPS 3	Spectrum
11.5	Use Math in Careers: Architect			330-331							
12.0	VOLUME	2 weeks									
12.1	Compute Volume										
1)	Rectangular prisms		SAT	340-341,356, 363,445	73 A			CC43,44	123,124 127,128 131,132	128	G85,86 P119
2)	Cylinders			344-345,356, 363,445	73 B			CC46			P120
3)	Pyramids			346-347,357, 363,445	74			CC45			G87,88 P121
4)	Cones			346-347,357, 363,445	74			CC46			P122
5)	Spheres			348-349,357 363,445				CC46			

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
				County Adopted *General Mathematics*		Supplementary Instructional Materials					
Number	Topic	Teaching Time	Tested On	TEXT	MPF	CSM	ICSP	PIZZAZZ	MPS 2	MPS 3	Spectrum
12.2	Apply Consumer Skills										
1)	Energy bills			342-343							
2)	Energy conservation			350-351							
12.3	Use Math in Careers: Oceanographer			352-353							
13.0	GRAPHING/ STATISTICS	2 weeks									
13.1	Graph Ordered Pairs		SAT	368-369,388				DD54,55			
13.2	Draw										
1)	Line graphs			370-371,388 446	77			CC63,64			P151,152
2)	Bar graphs			372-373,388 389,446				CC62			P149,150

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
				County Adopted *General Mathematics*		Supplementary Instructional Materials					
Number	Topic	Teaching Time	Tested On	TEXT	MPF	CSM	ICSP	PIZZAZZ	MPS 2	MPS 3	Spectrum
3)	Circle graphs			374-375,388 446	78			CC65,67			P153-156
13.3	Compute										
1)	Mean		SSAP SAT	378-379,389, 446	79			CC60		133	
2)	Median			380-381,389, 446,447	80			CC61		134	
3)	Mode			380-381,389, 446,447	80			CC61		135	
13.4	Apply Consumer Skills										
1)	Travel costs			376-377							
2)	Sports statistics			382-383							
13.5	Use Math in Careers: Adverstising Layout Artist			384-385							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted General Mathematics		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	PIZZAZZ	MPS 2	MPS 3	Spectrum
14.0	POSITIVE/ NEGATIVE NUMBERS	2 weeks									
14.1	Compare			394-395,416, 447							
14.2	Add		SAT	396-399,416, 447	82			AA13-18			
14,3	Subtract		SAT	402-405,417, 447	83			AA19-21 AA22-24			
14.4	Multiply		SAT	406-407,417, 447				AA25-28			
14.5	Divide		SAT	408-409,417, 448	84			AA29-32 DD8,9			
14.6	Apply Consumer Skills										
1)	Charts			400-401							
2)	Maps		SAT	410-411					43		
	Use Math in Careers: Well Driller			412-413							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted *General Mathematics*		Supplementary Instructional Materials					
				TEXT	MPF	CSM	ICSP	PIZZAZZ	MPS 2	MPS 3	Spectrum
15.0	EXPRESSIONS/ EQUATIONS	2 weeks									
15.1	Evaluate Variable Expressions			422-423,442, 448	86			DD10-21 DD23			P25
15.2	Solve Equations: One Variable		SAT								
1)	Addition principle		SAT	426-427,442, 448				DD29,30			P31,33
2)	Multiplication principle		SAT	428-429,442, 448				DD31,32			P27,29
3)	Addition/ Multiplication combined		SAT	430-431,443, 449	87 88			DD33,34			P26,35
15.3	Solve Word Problems		SAT	432-433,443, 449				DD39-41 DD45			P26,28, 30 P31,33, 36

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
CONTEMPORARY MATHEMATICS

Performance Objective		Instructional Implications		Resources							
				County Adopted General Mathematics		Supplementary Instructional Materials					
Number	Topic	Teaching Time	Tested On	TEXT	MPF	CSM	ICSP	PIZZAZZ	MPS 2	MPS 3	Spectrum
15.4	Graph Equations			436-437,443, 449				DD57-60			
15.5	Apply Consumer Skills										
1)	Interest			424-425							P71-78
2)	Credit costs			434-435							
15.6	Use Math in Careers: Optometrist			438-439							

INTRODUCTION

GENERAL MATH I

State Accreditator Number. .	2213
Course Code Number	1425
F.T.E. Category.	1.10
Instructional Level.	Standard

Report Card Abbreviation . .	GEN MATH 1
Length of Course	Year
Credit	1 Math Credit
Grade Level.	10, 11, 12

Prerequisites

Math Teachers Recommendation/Basic Skill Deficiency

Textbook(s)

Bolster, L. Carey, et al, Mathematics In Life (Glenview, Illinois: Scott, Foresman, and Company, 1977)

Notes to Teachers

Students will master the concepts and skills developed for General Math I, as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

GENERAL MATH I

1.0 Whole Numbers

- 1.1 Numbers To Ten Million
  - 1.1.1 Read
  - 1.1.2 Write
- 1.2 Order
- 1.3 Round
- *1.4 Add
- *1.5 Subtract
- *1.6 Multiply
- *1.7 Divide
- 1.8 Word Problems, Whole Numbers
  - 1.8.1 Identify operations
  - *1.8.2 Solve one-step problems

2.0 Fractions

- 2.1 Fractional Numbers
  - 2.1.1 Read
  - 2.1.2 Write
- 2.2 Order
- *2.3 Round Mixed Numbers
- 2.4 Find G.C.F.
- *2.5 Reduce Proper Fractions
- *2.6 Change Improper to Mixed
- *2.7 Change Mixed to Improper
- *2.8 Multiply
- *2.9 Divide
- 2.10 Find L.C.M.
- *2.11 Add
- *2.12 Subtract
- 2.13 Word Problems,
  - 2.13.1 Identify operations
  - *2.13.2 Solve one-step problems

3.0 Decimals

- 3.1 Decimal Numbers
  - 3.1.1 Read
  - 3.1.2 Write
- 3.2 State Place Value
- 3.3 Order
- *3.4 Round
- 3.5 Change Decimals to Fractions
- 3.6 Change Fractions to Decimals
- *3.7 Add
- *3.8 Subtract
- *3.9 Multiply
- *3.10 Divide
- 3.11 Word Problems
  - 3.11.1 Identify operations
  - *3.11.2 Solve one-step problems

4.0 Percents

- 4.1 Change Fractions to Percents
- 4.2 Change Percents to Fractions
- 4.3 Change Decimals to Percents
- *4.4 Change Percents to Decimals
- *4.5 Solve a% of b = ___
- *4.6 Solve ___% of b = c
- 4.7 Solve a% of ___ = c
- *4.8 Solve Word Problems

5.0 Perimeters and Areas

- *5.1 Squares
  - 5.1.1 Find perimeters
  - 5.1.2 Find areas
- *5.2 Rectangles
  - 5.2.1 Find perimeters
  - 5.2.2 Find areas
- 5.3 Triangles
  - *5.3.1 Find perimeters
  - 5.3.2 Find areas
- 5.4 Circles
  - 5.4.1 Find circumferences
  - 5.4.2 Find areas
- *5.5 Other Geometric Figures (Perimeters)
- 5.6 Word Problems
  - 5.6.1 Perimeters
  - 5.6.2 Areas

6.0 Measurement

- *6.1 Determine Elapsed Time
- *6.2 Determine Lengths of Lines
  - 6.2.1 Metric
  - 6.2.2 Customary
- 6.3 Solve Linear Measurement Problems
- 6.4 Solve Capacity Problems

*Indicates Minimum Level Skills

GENERAL MATH I	
6.5 Solve Weight Problems 7.0 Money 7.1 Determine Equivalent Amounts *7.2 Determine Correct Change 7.3 Solve Comparison Shopping Problems	

PERFORMANCE OBJECTIVES
GENERAL MATH I

General Math I is designed to insure mastery of computational skills as defined by the Florida State Department of Education in the State Student Assessment Test, Part I (SSAT). It introduces students to applications of computational skills in solving real world problems. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test. All Minimum Level Skills are also tested by the Florida State Assessment Program.

Performance Objectives

1.0 Whole Numbers

1.1 Students will (1) read and (2) write whole numbers less than ten million.

1.2 Students will arrange whole numbers (less than ten thousand) in increasing or decreasing order.

1.3 Students will round whole numbers less than ten thousand to designated places.

*1.4 Students will add two or more one-, two-, three, or four-digit whole numbers.

*1.5 Students will subtract one-, two-, three, four-, or five-digit whole numbers.

*1.6 Students will multiply one-, two-, or three-digit whole numbers.

*1.7 Students will divide whole numbers (dividends up to five digits, appropriate divisors up to three digits).

1.8 Students will:

(1) identify operations needed to solve one-step word problems involving whole numbers, and

*(2) solve one-step word problems.

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*Indicates Minimum Level Skills

2.0 Fractions

2.1 Students will (1) read and (2) write fractions having denominators of 2, 3, 4, 5, 6, 8, 10, 20, 25, 50, or 100.

2.2 Students will arrange proper fractions in increasing or decreasing order (denominators of 2, 3, 4, 5, 6, 8, 10, 20, 25, 50, or 100).

*2.3 Students will round mixed numbers with whole number components less than 100 to nearest whole numbers.

2.4 Students will find the greatest common factor (GCF) of two whole numbers.

*2.5 Students will reduce proper fractions to lowest terms.

*2.6 Students will change improper fractions to mixed numbers having whole number components less than 100 or to whole numbers less than 100.

*2.7 Students will change mixed numbers having whole number components less than 100 to improper fractions.

*2.8 Students will multiply (1) fractions and (2) whole numbers and fractions (mixed numbers having whole number components less than 10).

*2.9 Students will divide (1) fractions and (2) whole numbers and fractions (mixed numbers having whole number components less than 10).

2.10 Students will find the least common multiple (LCM) of two or three whole numbers.

*2.11 Students will add (1) fractions and (2) whole numbers and fractions (mixed numbers having whole number components less than 100, fractions having denominators of 2, 3, 4, 5, 6, 8, or 10).

*2.12 Students will subtract (1) fractions and (2) whole numbers and fractions (mixed numbers having whole number components less than 100, fractions having denominators of 2, 3, 4, 5, 6, 8, or 10).

2.13 Students will:

(1) identify operations needed to solve one-step word problems involving fractions and

*(2) solve one-step word problems involving fractions.

3.0 Decimals

3.1 Students will (1) read and (2) write decimals less than 100 having no more than four decimal places.

3.2 Students will state place values of given numbers in decimals less than 100 having no more than four decimal places.

3.3 Students will arrange decimals less than 100 having no more than four decimal places in increasing or decreasing order.

*3.4 Students will round decimals less than 100 having no more than four decimal places to designated places.

3.5 Students will change decimals to equivalent fractions, writing answers in lowest terms.

3.6 Students will change fractions to equivalent decimals.

*3.7 Students will add decimals having no more than four decimal places when given two or three decimals horizontally or vertically.

*3.8 Students will subtract decimals having no more than four decimal places when given decimals horizontally or vertically.

*3.9 Students will multiply decimals having no more than four decimal places.

*3.10 Students will divide decimals having no more than four decimal places.

3.11 Students will:

(1) identify operations needed to solve one-step word problems involving decimals and

*(2) solve one-step word problems involving decimals.

4.0 Percent

4.1 Students will change fractions to equivalent percents.

4.2 Students will change percents to equivalent fractions, writing answers in lowest terms.

4.3 Students will change decimals to equivalent percents.

*4.4 Students will change percents to equivalent decimals.

*4.5 Students will solve percent problems of the form a% of b = ___.

*4.6 Students will solve percent problems of the form ___% of b = c.

4.7 Students will solve percent problems of the form a% of ___ = c.

*4.8 Students will solve one-step word problems involving percents.

5.0 Perimeter and Area

*5.1 Students will find (1) perimeters and (2) areas of squares when given figures and appropriate information pertaining to the lengths of sides in metric or customary units.

*5.2 Students will find (1) perimeters and (2) areas of rectangles when given figures and appropriate information pertaining to the lengths and widths in metric or customary units.

5.3 Students will:

*(1) find perimeters of triangles when given appropriate information pertaining to the lengths of sides and

(2) find areas of triangles when given figures and appropriate information pertaining to base and altitude in metric or customary units.

5.4 Students will find (1) circumferences and (2) areas of circles when given lengths of radii in metric or customary units.

*5.5 Students will find perimeters of other geometric figures when given diagrams having appropriate measurements or when given appropriate information and measurements.

5.6 Students will solve one-step word problems involving (1) perimeters and (2) areas of squares, rectangles, and triangles.

6.0 Measurement

*6.1 Students will determine the elapsed time between two events when given the times of the events stated in hours and minutes.

*6.2 Students will determine the length of line segments by measuring to the nearest (1) millimeter and (2) one-eighth inch.

6.3 Students will solve word problems involving linear measurements in centimeters, meters, inches, feet, or yards requiring addition or subtraction, but no conversions.

6.4 Students will solve word problems involving capacities in liters, cups, pints, or quarts requiring addition or subtraction, but no conversions.

6.5 Students will solve word problems involving weights in grams, kilograms, ounces, or pounds requiring addition or subtraction, but no conversions.

7.0 Money

7.1 Students will determine equivalent amounts of money up to $20 using coins and paper currency.

*7.2 Students will determine the correct change from $1, $2, $5, $10, or $20 bills when given the total amount of the purchases or the cost of the individual items purchased.

7.3 Students will solve word problems involving comparison shopping for purchases less than $10.

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
GENERAL MATH I

Performance Objective		Instructional Implications		Resources	
Number	Topic	Teaching Time	Tested on	County Adopted	Supplementary
	FOR TEACHING TIME SEE TEACHING GUIDE IN TEACHER'S EDITION, PP. T-20 THROUGH T-25. FOR SPECIFIC TESTS ON PERFORMANCE OBJECTIVES, SEE COURSE OUTLINE.			Mervin L. Keedy, et al, General Mathematics (Menlo Park, Calif.: Addison-Wesley Publishing Company, 1980).	

INTRODUCTION
GENERAL MATH II

State Accreditator Number. .	2214
Course Code Number	1426
F.T.E. Category.	1.10
Instructional Level.	Standard

Report Card Abbreviation . .	GEN MATH 2
Length of Course	Year
Credit	1 Math Credit
Grade Level.	10,11,12

Prerequisites

Mastery of Basic Skills/Math Teacher Recommendation

Textbook(s)

Stein, Edwin I., Refresher Mathematics (Boston: Allyn and Bacon, Inc., 1980).

Notes to Teachers

Students will master the concepts and skills developed for General Math II as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

State Assessment objectives are indicated by the symbol δ.

GENERAL MATH II

1.0 Whole Numbers

- 1.1 Read and Write Large Numbers
- δ*1.2 Order Numbers
- δ*1.3 Round Numbers
- 1.4 Add (no more than four digits)
- 1.5 Subtract (no more than five digits)
- 1.6 Multiply
  - 1.6.1 3-digit numbers by 2-digit numbers
  - δ 1.6.2 3-digit numbers
  - 1.6.3 Multiples of 10, 100, 1000
- 1.7 Divide
  - 1.7.1 3-digit numbers by 1-digit numbers
  - 1.7.2 3-digit numbers by 2-digit multiples of 10
  - 1.7.3 5-digit numbers by 1-digit numbers
  - δ 1.7.4 5-digit numbers by 2-digit numbers
  - 1.7.5 5-digit numbers by multiples of 10, 100, 1000

2.0 Word Problems, Whole Numbers

- 2.1 Select Number Sentences for Word Problems
- 2.2 Translate Word Problems to Number Sentences
- δ 2.3 Determine Whether Sufficient Information Exists
- δ*2.4 Estimate Solutions, Rounding
- δ*2.5 Estimate Solutions, Addition
- δ*2.6 Estimate Solutions, Subtraction
- δ 2.7 Estimate Solutions, Multiplication
- δ 2.8 Estimate Solutions, Division
- δ*2.9 Find Solutions to One- or Two-step Problems
- δ*2.10 Find Averages

3.0 Decimals

- 3.1 Read and Write Decimals
- 3.2 Order Decimals
- 3.3 Round Decimals to Whole Numbers
- δ*3.4 Round Decimals to Designated Places
- 3.5 Add (no more than two decimal places)
- 3.6 Subtract (no more than two decimal places)
- 3.7 Multiply
  - 3.7.1 Whole numbers and decimals
  - δ 3.7.2 Two decimals
  - 3.7.3 Decimals by 10, 100, 1000
- 3.8 Divide
  - 3.8.1 Decimals by whole numbers
  - δ 3.8.2 Decimals
  - 3.8.3 Decimals by 10, 100, 1000

4.0 Word Problems, Decimals

- 4.1 Translate Word Problems to Number Sentences
- δ 4.2 Find Solutions to Problems

5.0 Factors and Multiples

- 5.1 Find Factors
- 5.2 Find Multiples
- 5.3 Distinguish between Primes and Composites
- 5.4 Find GCF
- 5.5 Find LCM

6.0 Fractions

- 6.1 Read and Write Fractions

*Indicates Minimum Level Skills
δIndicates State Student Assessment skills

GENERAL MATH II

- 6.2 Write Equivalent Fractions
- ó 6.3 Improper Fractions to Mixed Numbers
- ó 6.4 Mixed Numbers to Improper Fractions
- ó 6.5 Round Mixed Numbers to Whole Numbers
- 6.6 Multiply Fractions
  - 6.6.1 Proper
  - 6.6.2 Improper
- 6.7 Multiply Fractions and Whole Numbers
- ó 6.8 Multiply Whole Numbers and Mixed Numbers
- 6.9 Multiply Mixed Numbers
- 6.10 Divide Whole Numbers by Fractions
- 6.11 Divide Fractions
- 6.12 Divide Mixed Numbers
- 6.13 Write Equivalent Fractions
  - 6.13.1 Identify LCD
  - 6.13.2 Write with LCD
- 6.14 Order Fractions and Mixed Numbers
- 6.15 Add Proper Fractions
- ó 6.16 Add Mixed Numbers
- 6.17 Subtract Proper Fractions
- ó 6.18 Subtract Whole Numbers and Mixed Numbers
- ó 6.19 Subtract Mixed Numbers
- ó*6.20 Identify Decimals Equivalent to Proper Fractions

7.0 Word Problems, Fractions

- 7.1 Translate Word Problems to Number Sentences
- *7.2 Addition and Subtraction (Like Denominators)
- ó*7.3 Addition and Subtraction (Unlike Denominators)
- *7.4 Multiplication, Proper Fractions

8. Ratios, Proportions, and Percents

- 8.1 Equal Ratios
- 8.2 Find Cross-products
- 8.3 Ratios and Proportions
- 8.4 Find Missing Terms, Proportions
- 8.5 Fractions to Percents
- ó 8.6 Percents to Fractions
- 8.7 Decimals to Percents
- 8.8 Percents to Decimals
- ó 8.9 Percents to Decimals or Fractions
- ó*8.10 Find Percents
  - 8.10.1 Whole numbers
  - 8.10.2 Decimals
- *8.11 Find what Percent One Number is of Another
- 8.12 Find a Number when a Percent of it is Known

9.0 Word Problems, Percents

- 9.1 Translate Word Problems to Number Sentences
- ó*9.2 Find Solutions to Word Problems

10.0 Values of Coins and Bills

- 10.1 Read and Write Money Values
- ó 10.2 Determine Equivalent Amounts of Money

11.0 Words Problems, Money

- 11.1 Determine Change after Purchase
- ó*11.2 Solve Problems, Comparison Shopping
- ó*11.3 Solve Problems, Simple Interest
- ó*11.4 Solve Problems, Rate of Discount
- ó*11.5 Solve Problems, Sales Tax
- *11.6 Solve Problems, Wages

GENERAL MATH II

12.0 Measurement

ó*12.1 Elapsed Time Between Events
ó 12.2 Measure Lengths, Widths, Heights
ó 12.3 Estimate Lengths, Widths, Heights
ó 12.4 Determine Capacity (Milliliters)
ó 12.5 Estimate Capacity
ó 12.6 Estimate Mass/Weight
ó 12.7 Identify Temperatures

13.0 Word Problems, Measurement

13.1 Convert Units of Length
    13.1.1 Customary
    13.1.2 Metric
ó 13.2 Solve Problems, Length (Metric, Customary)
ó 13.3 Solve Problems Perimeters of Rectangular Regions
    13.3.1 Customary
    13.3.2 Metric
13.4 Solve Problems, Perimeters of Simple Geometric Figures
13.5 Convert Units of Area
    13.5.1 Customary
    13.5.2 Metric
ó 13.6 Solve Problems, Areas of Rectangular Regions
    13.6.1 Metric
    13.6.2 Customary
13.7 Solve Problems, Areas Enclosed by Simple Geometric Figures
13.8 Convert Units of Capacity
    13.8.1 Customary
    13.8.2 Metric
ó*13.9 Solve Problems, Capacity (Metric, Customary)
13.10 Convert Units of Weight/Mass
    13.10.1 Customary
    13.10.2 Metric
ó*13.11 Solve Problems Weight/Mass (Metric, Customary)

14.0 Geometric Figures and Shapes

14.1 Circles, Squares, Rectangles, and Triangles
14.2 Cubes, Cylinders, Cones, and Spheres

15.0 Graphs, Tables, and Maps

ó*15.1 Read Graphs and Tables
    15.1.1 Line Graphs
    15.1.2 Circle Graphs
    15.1.3 Tables
*15.2 Determine Solutions from Scale Drawings
ó*15.3 Find Distance on Highway Maps

PERFORMANCE OBJECTIVES
GENERAL MATH II

General Math II is designed to continue the mathematical development of students who have mastered computational skills. The units range from a review of the fundamental operations with whole numbers, fractions, decimals and percents to the solution of mathematical problems found in daily living as defined by the State Department of Education in the State Student Assessment Test (SSAT). Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Whole Numbers

1.1 Students will read and write whole numbers less than ten million.

δ*1.2 Students will put in order any three whole numbers through ten million.

δ*1.3 Students will round whole numbers less than one million to designated places.

1.4 Students will add one-, two-, three-, or four-digit whole numbers.

1.5 Students will subtract one-, two-, three-, four-, or five-digit whole numbers.

1.6 Students will:

- (1) multiply three-digit whole numbers by two digit whole numbers;
- δ (2) multiply two three-digit whole numbers; and
- (3) multiply whole numbers by multiples of 10, 100, and 1000.

1.7 Students will:

- (1) divide three-digit whole numbers by one-digit whole numbers;
- (2) divide three digit whole numbers by two-digit multiples of 10;

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*Indicates Minimum Level Skills
δIndicates State Student Assessment skills

(3) divide five-digit whole numbers by one-digit whole numbers;

ó (4) divide five-digit whole numbers by two-digit whole numbers; and

(5) divide five digit whole numbers by multiples of 10, 100, or 1000.

2.0 Word Problems, Whole Numbers

2.1 Students will select number sentences for given word problems.

2.2 Students will translate given word problems into number sentences using appropriate mathematical symbols.

ó 2.3 Students will determine whether insufficient, sufficient, or extraneous information is given for finding solutions to one- or two-step word problems.

ó*2.4 Students will estimate solutions to real world problems by rounding to appropriate places.

ó*2.5 Students will estimate solutions to real world addition problems involving up to four-digit numbers rounded to the nearest tens, hundreds, or thousands.

ó*2.6 Students will estimate solutions to real world subtraction problems involving up to four-digit numbers rounded to the nearest tens, hundreds, or thousands.

ó 2.7 Students will estimate solutions to real world multiplication problems involving up to three-digit numbers rounded to the nearest tens or hundreds.

ó 2.8 Students will estimate solutions to real world division problems involving up to three-digit numbers rounded to the nearest tens or hundreds.

ó*2.9 Students will find solutions to word problems involving one or two distinct operations.

ó*2.10 Students will find solutions to word problems involving averages of no more than ten numbers and no more than two distinct operations.

3.0 Decimals

3.1 Students will read and write decimals through the hundredth's place.

3.2 Students will arrange one- or two-place decimals in increasing or decreasing order.

3.3 Students will round one- or two-place decimals to nearest whole numbers.

δ*3.4 Students will round numbers less than 100 with no more than three decimal places to any designated place.

3.5 Students will add one- or two-place decimals.

3.6 Students will subtract one- or two-place decimals.

3.7 Students will:

(1) multiply whole numbers and one- or two-place decimals;

δ (2) multiply two decimals each having no more than two decimal places; and

(3) multiply decimals by 10, 100, or 1000.

3.8 Students will:

(1) divide decimals by whole numbers;

δ (2) divide one- or two-place decimals; and

(3) divide decimals by 10, 100, or 1000.

4.0 Word Problems, Decimals

4.1 Students will translate given word problems into number sentences using appropriate mathematical symbols.

δ 4.2 Students will determine solutions to word problems involving decimals.

5.0 Factors and Multiples

5.1 Students will find factors of given numbers.

5.2 Students will find multiples of given numbers.

5.3 Students will distinguish between prime and composite numbers when given numbers less than 500.

5.4 Students will find the greatest common factor (GCF) when given two numbers.

5.5 Students will find the least common multiple (LCM) when given two numbers.

6.0 Fractions

6.1 Students will read and write fractions having denominators of 2, 3, 4, 5, 6, 8, 10, 20, 50, or 100.

6.2 Students will write equivalent fractions when given proper fractions having denominators of 2, 3, 4, 5, 6, 8, 10, 20, 25, or 100.

ò 6.3 Students will identify a mixed number having a whole number component less than 100 that is equivalent to an improper fraction.

ò 6.4 Students will identify improper fractions which are equivalent to mixed numbers having whole number components less than 100.

ò 6.5 Students will round a mixed number with a whole number component less than 100 to the nearest whole number.

6.6 Students will multiply (1) proper fractions and (2) improper fractions.

6.7 Students will multiply fractions and whole numbers.

ò 6.8 Students will multiply whole numbers and mixed numbers.

6.9 Students will multiply mixed numbers.

6.10 Students will divide whole numbers by fractions.

6.11 Students will divide fractions.

6.12 Students will divide mixed numbers.

6.13 When given two or more fractions having unlike denominators, students will (1) identify the LCD and (2) rewrite the fractions having the LCD as the common denominator.

6.14 Students will arrange fractions or mixed numbers in increasing or decreasing order.

6.15 Students will add proper fractions having unlike denominators of 2, 3, 4, 5, 6, 8, or 10.

ò 6.16 Students will add mixed numbers having whole number components less than 100 and denominators of 2, 3, 4, 5, 6, 8, or 10.

6.17 Students will subtract proper fractions having unlike denominators of 2, 3, 4, 5, 6, 8, or 10.

ò 6.18 Students will subtract whole numbers and mixed numbers with denominators of 2, 3, 4, 5, 6, 8, or 10.

δ 6.19 Students will subtract two mixed numbers with denominators of 2, 3, 4, 5, 6, 8, or 10.

δ*6.20 Students will identify a decimal that is equivalent to a proper fraction having a denominator of 2, 3, 4, 5, 20, 25, 100, or 1000.

7.0 Word Problems, Fractions

7.1 Students will translate given word problems into number sentences using appropriate mathematical symbols.

*7.2 Students will find solutions to word problems involving addition and subtraction of proper fractions with like denominators.

δ*7.3 Students will find solutions to word problems involving addition and subtraction of proper fractions with unlike denominators of 2, 3, 4, 5, 6, 8, or 10.

*7.4 Students will find solutions to word problems involving multiplication of proper fractions.

8.0 Ratios, Proportions, and Percents

8.1 Students will identify ratios equal to given ratios.

8.2 Students will find cross-products for equal ratios.

8.3 Students will identify whether given ratios form proportions.

8.4 Students will find missing terms when given proportions having one unknown term.

8.5 Students will write percents for fractions.

δ 8.6 Students will write fractions for percents.

8.7 Students will write percents for decimals.

8.8 Students will write decimals for percents.

δ 8.9 Students will identify decimals or percents which are equivalent to proper fractions having a denominator of 2, 3, 4, 5, 20, 50 or 100.

δ*8.10 Students will find percents (whole numbers less than 100) of (1) whole numbers and (2) numbers with no more than two decimal places.

*8.11 Students will find what percent one number is of another.

8.12 Students will find a number when a percent of it is known.

9.0 Word Problems, Percents

9.1 Students will translate given word problems into number sentences using appropriate mathematical symbols.

δ*9.2 Students will find solutions to word problems involving percents and one or two distinct operations.

10.0 Values of Coins and Bills

10.1 Students will read and write money values through $1,000.

δ 10.2 Students will determine equivalent amounts of up to one hundred dollars using coins and paper currency.

11.0 Word Problems, Money

11.1 Students will determine the change to be received from a twenty dollar bill when given the amount of the purchase.

δ*11.2 Students will solve problems involving comparison shopping.

δ*11.3 Students will solve problems involving simple interest.

δ*11.4 Students will solve problems involving purchases and rates of discount given in fraction or percent form.

δ*11.5 Students will solve problems involving purchases and rates of sales tax.

*11.6 Students will solve problems involving the computation of of hourly wages or hourly plus overtime wages.

12.0 Measurement

δ*12.1 Students will determine the elapsed time between two events stated in seconds, minutes, hours, days, weeks, months, or years.

δ 12.2 Students will determine lengths, widths, or heights by measuring objects to the nearest millimeter or one-eighth inch.

δ 12.3 Students will estimate the lengths, widths, or heights of objects in millimeters, centimeters, meters, feet, or inches.

δ 12.4 Students will determine capacity by measuring quantities in milliliters.

δ 12.5 Students will estimate capacity in milliliters, liters, cups, or quarts.

ò 12.6 Students will estimate mass/weight in grams, kilograms, ounces, or pounds.

ò 12.7 Students will identify the freezing and boiling points of water, normal body temperature, and comfortable room temperature in Celsius or Fahrenheit.

13.0 Word Problems, Measurements

13.1 Students will convert units of length within the (1) customary and (2) metric systems.

ò 13.2 Students will solve problems related to length, width, or height, using metric or customary units up to kilometers or miles, conversion within the system.

ò 13.3 Students will solve problems involving perimeters of rectangular regions using (1) metric or (2) customary units.

13.4 Students will solve problems involving perimeters of simple geometric figures using (1) metric or (2) customary units.

13.5 Students will convert units of area within the (1) customary and (2) metric systems.

ò 13.6 Students will solve problems involving areas of rectangular regions using (1) metric or (2) customary units.

13.7 Students will solve problems involving areas of regions enclosed by simple geometric figures using (1) metric or (2) customary units.

13.8 Students will convert units of capacity within the (1) customary and (2) metric systems.

ò*13.9 Students will solve problems involving capacity using units given in a table (milliliters, liters, teaspoons, tablespoons, cups, pints, quarts, gallons), conversion within the system.

13.10 Students will convert units of weight/mass within the (1) customary and (2) metric systems.

ò*13.11 Students will solve problems involving weight/mass using units given in a table (milligrams, grams, kilograms, metric tons, ounces, pounds, tons), conversion within the system.

14.0 Geometric Figures and Shapes

14.1 Students will identify circles, squares, rectangles, and triangles.

14.2 Students will identify cubes, cylinders, cones, and spheres.

15.0 Graphs, Tables, and Maps

6*15.1 Students will read and determine relationships described by (1) line graphs, (2) circle graphs, or (3) tables.

*15.2 Students will determine solutions to problems relating to scale drawings.

6*15.3 Students will find the approximate distance between two given points on a highway map, using a scale.

INTRODUCTION
GEOMETRY

State Accreditator Number. . 2218
Course Code Number 1505
F.T.E. Category. 1.10
Instructional Level. . . . . Standard

Report Card Abbreviation . . GEOMETRY
Length of Course . . . . . . Year
Credit . . . . 1 Math Credit
Grade Level. 10, 11, 12

Prerequisites

Mastery of Minimum Level Skills of Algebra/Math Teacher Recommendation

Textbook(s)

Jurgensen, Ray C., *Geometry*, *New Edition* (Atlanta: Houghton Mifflin Company, 1980).

Notes to Teachers

Students will master the concepts and skills developed for Geometry as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

GEOMETRY

1.0 Basic Language

- *1.1 Undefined Terms
  - 1.1.1 Point
  - 1.1.2 Line
  - 1.1.3 Plane
- 1.2 State Postulates/Theorems (Points, Lines, Planes)
- *1.3 Define Segment/Related Terms
  - 1.3.1 Midpoint
  - 1.3.2 Congruent
  - 1.3.3 Bisector
  - 1.3.4 Betweenness
- 1.4 Define Ray
- 1.5 State Theorems (Segments/Rays)
- 1.6 Solve Problems (Segments/Rays)
- 1.7 State Postulates/Theorems
  - 1.7.1 Equality
  - 1.7.2 Inequality
- 1.8 Identify Parts of Conditional Statement
  - 1.8.1 Hypothesis
  - 1.8.2 Conclusion
- 1.9 Complete Simple Proofs, Two-Column Form

2.0 Angles

- *2.1 Define Angle/Related Terms
  - 2.1.1 Measure
  - 2.1.2 Congruent
  - 2.1.3 Adjacent
  - 2.1.4 Interior/exterior
  - 2.1.5 Bisector
- *2.2 Define Types of Angles and Angle Relationships
  - 2.2.1 Acute, right, obtuse
  - 2.2.2 Complementary, supplementary
  - 2.2.3 Vertical
  - 2.2.4 Dihedral
- *2.3 Define Perpendicular Lines
- 2.4 State Postulates/Theorems (Angles)
- *2.5 Solve Problems (Angles, Angle Relationship)
- *2.6 Complete Simple Proofs

3.0 Parallel Lines/Planes

- *3.1 Define Parallel Lines/Planes/Related Terms
  - 3.1.1 Skew
  - 3.1.2 Transversal
  - 3.1.3 Corresponding angles
  - 3.1.4 Alternate interior angles
  - 3.1.5 Alternate exterior angles
  - 3.1.6 Interior angles on the same side of transversal
- 3.2 State Postulates/Theorems (Parallel Lines/Planes)
- *3.3 Solve Problems Related To Parallel Lines
- *3.4 Justify Statements In Proofs
- 3.5 Write Proofs
  - 3.5.1 Direct
  - 3.5.2 Indirect

4.0 Polygons

- 4.1 Define Triangle/Related Terms
  - 4.1.1 Exterior angles
  - 4.1.2 Remote interior angles
- 4.2 Classify Triangles
  - 4.2.1 By sides
  - 4.2.2 By angles
- 4.3 State Theorems (Triangles)
- 4.4 Solve Problems (Triangles)
- 4.5 Define Polygon/Related Terms
  - 4.5.1 Convex/non-convex
  - 4.5.2 Regular
  - 4.5.3 Diagonals
- 4.6 Apply Formulas Related To Angle Measures of Polygons

*Indicates Minimum Level Skills

GEOMETRY

5.0 Congruent Triangles

- 5.1 Define Congruent Triangles/ Related Terms
  - 5.1.1 Corresponding angles & sides
  - 5.1.2 Included angles, included sides
- *5.2 State Postulates/Theorems of Congruent Triangles
  - 5.2.1 SSS, SAS, ASA, and, AAS
  - 5.2.2 HL, LL, HA, and LA
- *5.3 Complete Proofs
  - 5.3.1 Congruent triangles
  - 5.3.2 CPCTC
- 5.4 Write Proofs
  - 5.4.1 Congruent triangles
  - 5.4.2 CPCTC
- 5.5 Define Isosceles Triangles & Related Terms
  - 5.5.1 Altitude
  - 5.5.2 Median
- 5.6 State Theorems (Isosceles Triangles)
- 5.7 Solve Problems (Isosceles Triangles)
- 5.8 Write Proofs (Isosceles Triangles)

6.0 Quadrilaterals

- 6.1 Definition, Parallelogram
- 6.2 State Theorems (Parallelograms)
- 6.3 Solve Problems (Parallelograms)
- 6.4 Justify Statements in Proofs (Parallelograms)
- 6.5 Write Proofs (Parallelograms)
- 6.6 Define Rectangle, Rhombus, and Square
- 6.7 State Theorems (Rectangles, Rhombuses, Squares)
- 6.8 Classify Parallelograms
- 6.9 Write Proofs (Rectangles, Rhombuses, Squares)
- 6.10 Define Trapezoid/Related Terms
  - 6.10.1 Median
  - 6.10.2 Isosceles
- 6.11 State Theorems (Trapezoids)
- 6.12 Solve Problems (Trapezoids)
- 6.13 Write Proofs

7.0 Inequalities

- 7.1 State Inequality Theorems
  - 7.1.1 One triangle
  - 7.1.2 Two triangles
- 7.2 Solve Problems
- 7.3 Write Proofs

8.0 Similar Polygons

- 8.1 State Properties of a Proportion
- *8.2 Solve Problems Using Ratio/ Proportions
- 8.3 Define Similar Polygons
- 8.4 State Theorems
- *8.5 Solve Problems
- 8.6 Write Proofs

9.0 Right Triangles

- 9.1 Define Right Triangles & Related Terms
  - 9.1.1 Hypotenuse
  - 9.1.2 Leg
- 9.2 State Theorems
  - 9.2.1 Pythagorean Theorem/ Converse
  - 9.2.2 Special Triangles (30-60-90, 45-45-90)
- *9.3 Solve Problems

GEOMETRY

10.0 Circles

- 10.1 Define Circle/Related Terms
  - 10.1.1 Radius, diameter
  - 10.1.2 Secant, tangent chord
  - 10.1.3 Central angles, inscribed angles
  - 10.1.4 Arcs, segments, sectors
- *10.2 Identify Parts of Circle Given a Drawing
  - 10.2.1 Radius, diameter, chords
  - 10.2.2 Secants, tangents, points of tangency
  - 10.2.3 Central angles, inscribed angles
  - 10.2.4 Arcs, segments, sectors
- 10.3 State Postulates/Theorems
- 10.4 Solve Problems
- 10.5 Write Proofs

11.0 Areas & Volumes

- 11.1 State Postulates/Theorems (Area of Polygons)
- *11.2 Solve Problems (Area of Polygons)
- 11.3 State Theorems (Area/ Circumference /Circles)
- *11.4 Solve Problems (Area/ Circumference/Circles)
- 11.5 Define Terms Related to Solids
  - 11.5.1 Altitude, slant height
  - 11.5.2 Lateral area, total area
  - 11.5.3 Face, edge
- 11.6 Find Lateral Area/Total Area
  - 11.6.1 Prisms
  - 11.6.2 Pyramids
  - 11.6.3 Cylinders
  - 11.6.4 Cones
- 11.7 Find Volumes
  - 11.7.1 Prisms
  - 11.7.2 Pyramids
  - 11.7.3 Cylinders
  - 11.7.4 Cones

12.0 Constructions: Straightedge/ Compass

- 12.1 Perform Fifteen Basic Constructions
- 12.2 Apply Constructions to Problems

13.0 Coordinate Geometry

- 13.1 Plot Graph of Ordered Pairs
- 13.2 State Formulas
  - 13.2.1 Distance
  - 13.2.2 Midpoint
- 13.3 Solve Problems Requiring Distance, Midpoint Formulas
- 13.4 Define Slope of a Line
- 13.5 Find Slope of a Line
  - 13.5.1 Two points
  - 13.5.2 Equation of a line
- 13.6 State Slope Theorems
  - 13.6.1 Parallel lines
  - 13.6.2 Perpendicular lines
- 13.7 Solve Problems Related to the Slopes
  - 13.7.1 Parallel lines
  - 13.7.2 Perpendicular lines
- 13.8 State Theorems Related to Equation of Line
- 13.9 Write Equations of Lines
  - 13.9.1 Point/slope
  - 13.9.2 Two points
- 13.10 Graph Equations of Lines
- 13.11 Write Proofs Using Principles of Coordinate Geometry

PERFORMANCE OBJECTIVES
GEOMETRY

Geometry has been defined as the science of shapes and spatial relationships. This course in geometry stresses a continuous usage of algebraic skills with rigorous attention to the concept of proof in two- and three-space. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Basic Language

*1.1 Students will identify the undefined terms of geometry as (1) point, (2) line, and (3) plane.

1.2 Students will state the postulates and theorems related to points, lines, and planes.

*1.3 Students will define segment and the related terms (1) midpoint, (2) congruent, (3) bisector, and (4) betweenness.

1.4 Students will define rays.

1.5 Students will state theorems related to segments and rays.

1.6 Students will solve problems involving segments and rays.

1.7 Students will state the postulates and theorems of (1) equality and (2) inequality.

1.8 Given a conditional statement, students will identify (1) the hypothesis and (2) the conclusion.

1.9 Students will complete simple proofs in two-column form.

2.0 Angles

*2.1 Students will define angle and related terms (1) measure of an angle, (2) congruent angles, (3) adjacent angles, (4) interior and exterior points, and (5) bisector of an angle.

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*Indicates Minimum Level Skills

*2.2 Students will define the types of angles and angle relationships: (1) right or obtuse; (2) complementary or supplementary; (3) vertical; or (4) dihedral angles.

*2.3 Students will define perpendicular lines.

2.4 Students will state postulates and theorems related to angles.

*2.5 Students will solve problems related to angles and angle relationships including supplementary, complementary, vertical angles, angle bisector, and the angle addition postulate.

*2.6 Students will complete simple proofs involving angles and angle relationships including supplementary, complementary, vertical angles, angle bisectors, perpendicular lines, and the angle addition postulate.

3.0 Parallel Lines and Planes

*3.1 Students will define parallel lines, planes, and related terms (1) skew lines, (2) transversal, (3) corresponding angles, (4) alternate interior angles, (5) alternate exterior angles, and (6) interior angles on the same side of the transversal.

3.2 Students will state postulates and theorems related to parallel lines and planes.

*3.3 Students will solve problems related to parallel lines and planes.

*3.4 Students will justify the statements of a proof requiring postulates and theorems related to parallel lines and planes.

3.5 Students will write proofs related to parallel lines and planes including (1) direct proofs and (2) indirect proofs.

4.0 Polygons

4.1 Students will define triangle and related terms (1) exterior angles and (2) remote interior angles.

4.2 Students will classify triangles by (1) sides and (2) angles.

4.3 Students will state theorems related to triangles.

4.4 Students will solve problems related to triangles.

4.5 Students will define polygon and related terms (1) convex and non-convex polygons, (2) regular polygons, and (3) diagonals.

4.6 Students will apply the formulas related to the measure of angles of polygons.

5.0 Congruent Triangles

5.1 Students will define congruent triangles and related terms (1) corresponding angles and corresponding sides and (2) included angles and included sides.

*5.2 Students will state postulates and theorems related to congruent triangles including (1) SSS, SAS, ASA, AAS and (2) HL, LL, HA, LA.

*5.3 Given the statement or the reason, students will complete proofs demonstrating (1) the congruency of triangles and (2) that corresponding parts of congruent triangles are congruent.

5.4 Students will write proofs to demonstrate (1) the congruency of triangles and (2) that corresponding parts of congruent triangles are congruent.

5.5 Students will define isosceles triangle and related terms (1) altitude and (2) median.

5.6 Students will state theorems related to isosceles triangles.

5.7 Students will solve problems related to isosceles triangles.

5.8 Students will write proofs related to isosceles triangles.

6.0 Quadrilaterials

6.1 Students will identity the definition of parallelogram.

6.2 Students will state theorems related to parallelograms.

6.3 Students will solve problems related to parallelograms.

6.4 Students will justify the statements of proofs related to parallelograms.

6.5 Students will write proofs related to parallelograms.

6.6 Students will define rectangle, rhombus, and square.

6.7 Students will state theorems related to rectangles, rhombuses, and squares.

6.8 Students will classify parallelograms according to properties.

6.9 Students will write proofs related to rectangles, rhombuses, and squares.

6.10 Students will define trapezoid and related terms (1) median of a trapezoid and (2) isosceles trapezoid.

6.11 Students will state theorems related to trapezoids.

6.12 Students will solve problems related to trapezoids.

6.13 Students will write proofs related to trapezoids.

7.0 Inequalities

7.1 Students will state inequality theorems related to (1) one triangle and (2) two triangles.

7.2 Students will solve problems involving inequalities of triangles.

7.3 Students will write proofs related to inequalities of triangles.

8.0 Similar Polygons

8.1 Students will state properties of a proportion.

*8.2 Students will solve problems using ratio and proportions including finding missing terms, writing equivalent proportions, and finding the ratio of segments.

8.3 Students will define similar polygons.

8.4 Students will state theorems related to similar polygons.

*8.5 Students will solve problems related to similar polygons including finding the length of a side and finding the perimeter.

8.6 Students will write proofs related to similar polygons.

9.0 Right Triangles

9.1 Students will define right triangle and related terms (1) hypotenuse and (2) leg.

9.2 Students will state (1) the Pythagorean Theorem and its converse and (2) the special triangle (30-60-90, 45-45-90) theorems.

*9.3 Students will solve problems requiring the application of the Pythagorean Theorem and its converse.

10.0 Circles

10.1 Students will define circle and related terms (1) radius and diameter; (2) secant, tangent, and chord; (3) central angle and inscribed angle; and (4) arcs, segments, and sectors.

*10.2 Students will identify (1) the radius, diameter, and chords; (2) secants, tangents, and points of tangency; (3) central angles and inscribed angles; and (4) arcs, segments and sectors when given a diagram showing the parts of a circle.

10.3 Students will state postulates and theorems related to circles.

10.4 Students will solve problems related to circles including finding the measures of angles, the measures of arcs, and the lengths of chords and radii.

10.5 Students will write proofs related to circles.

11.0 Area and Volumes

11.1 Students will state postulates and theorems related to the area of polygons.

*11.2 Students will solve problems related to the areas of polygons including finding the area of rectangles, triangles, squares, parallelograms, and trapezoids.

11.3 Students will state theorems related to the area and circumference of circles.

*11.4 Students will solve problems related to the area and circumference of circles when given the radius or the diameter.

11.5 Students will define the terms related to solids including (1) altitude and slant height, (2) lateral area and total area, and (3) face and edge.

11.6 Students will find the lateral area and the total area of selected solids including (1) prisms, (2) pyramids, (3) cylinders, and (4) cones.

11.7 Students will find the volumes of selected solids including (1) prisms, (2) pyramids, (3) cylinders, and (4) cones.

12.0 Constructions with Straightedge and Compass

12.1 Students will perform the fifteen basic constructions.

12.2 Students will apply the constructions to the solution of problems.

13.0 Coordinate Geometry

13.1 Students will plot the graphs of ordered pairs on coordinate plane.

13.2 Students will state formulas including (1) the distance formula and (2) the midpoint formula.

13.3 Students will solve problems requiring the use of the distance formula and the midpoint formula.

13.4 Students will define slope of a line.

13.5 Students will find the slope of a line given (1) two points on the graph of the line and (2) the equation of the graph of the line.

13.6 Students will state the theorems related to the slopes of (1) parallel lines and (2) perpendicular lines.

13.7 Students will solve problems related to the slopes of (1) parallel lines and (2) perpendicular lines.

13.8 Students will state the theorems related to the equation of a line.

13.9 Students will write the equation of a line when given (1) a point and the slope or (2) two points.

13.10 Students will graph equations of lines.

13.11 Students will write proofs using the principles of coordinate geometry.

INTRODUCTION

GEOMETRY, ANALYTIC

State Accreditator Number. .	2295
Course Code Number	1515
F.T.E. Category.	1.10
Instructional Level.	Advanced
Report Card Abbreviation . .	ADV GEOM ANA
Length of Course	Semester
Credit	1/2 Math Credit
Grade Level.	11, 12

Prerequisites

Trigonometry

Textbook(s)

Fuller, Gordon, Analytic Geometry (Menlo Park, California: Addison-Wesley Publishing Company, 1973).

Notes to Teachers

Students will master the concepts and skills developed for Analytic Geometry as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

GEOMETRY, ANALYTIC

1.0 Review of Fundamental Concepts

- 1.1 Compute Distance Between Two Points
- 1.2 Determine Slopes of Lines
- *1.3 Determine Angle of Inclination
- *1.4 Determine Angle Between Two Lines
- *1.5 Find Division Points of Segment
- 1.6 Prove Geometric Theorems
- 1.7 Graph Relations
- 1.8 Write Equations of Relations

2.0 Lines

- *2.1 Recognize Equations of Lines
  - 2.1.1 $Ax+By+C = 0$ form
  - 2.1.2 Intercept form
  - 2.1.3 Slope-intercept form
  - 2.1.4 Point-slope form
- 2.2 Write Equations of Lines
- *2.3 Compute Distances from Lines to Points
- 2.4 Families of Lines
  - *2.4.1 Select equations
  - 2.4.2 Write equations
- 2.5 Solve Problems, Parallel and Perpendicular Lines

3.0 Circles

- 3.1 Define Circle
- 3.2 Write Equations of Circles
  - 3.2.1 Center, radius
  - 3.2.2 Three points
- *3.3 Determine Centers and Radii from General Form
- *3.4 Select Equations that Satisfy Given Conditions
- *3.5 Solve Problems, Circles and Lines
- 3.6 Write Equations, Families of Circles

4.0 Parabolas

- 4.1 Define Parabola
- 4.2 Graph Equations, $y^2 = 4ax$ or $x^2 = 4ay$ Form
  - *4.2.1 Identify focus
  - 4.2.2 Write equation of directrix
  - *4.2.3 Find length of latus rectum
  - 4.2.4 Sketch parabola
- 4.3 Graph the Equation $x^2+Dx+Ey+F = 0$, $y^2+Dx+Ey+F = 0$
  - *4.3.1 Identify vertex
  - *4.3.2 Identify focus
  - 4.3.3 Determine axis
  - *4.3.4 Find length of latus rectum
  - 4.3.5 Write equation of directrix
  - 4.3.6 Sketch parabola
- *4.4 Select Equation of Parabolas
- 4.5 Write Equation of Parabolas

5.0 Ellipses

- 5.1 Define Ellipse
- 5.2 Graph Equations,

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1,$$

$$\frac{y^2}{a^2} + \frac{x^2}{b^2} = 1$$

  - *5.2.1 Identify center
  - *5.2.2 Identify vertices
  - *5.2.3 Find foci
  - *5.2.4 Find length of major and minor axes
  - *5.2.5 Find length of latus rectum
  - 5.2.6 Sketch ellipse
- 5.3 Graph Equations, $Ax^2+Cy^2+Dx+Ey+F = 0$ with $A \neq C$, $A > 0, C > 0$

*Indicates Minimum Level Skills

GEOMETRY, ANALYTIC

5.3.1 Write equations in $\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$ or $\frac{(y-k)^2}{a^2}+\frac{(x-h)^2}{b^2}=1$ form
*5.3.2 Identify center
*5.3.3 Identify vertices
5.3.4 Find length of a latus rectum
*5.3.5 Find foci
*5.3.6 Find lengths of major and minor axes
5.3.7 Sketch ellipse
5.4 Solve Problems Involving Ellipses

6.0 Hyperbolas

6.1 Define Hyperbola
6.2 Graph Equations, $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$, or $\frac{y^2}{a^2}-\frac{x^2}{b^2}=1$ form
*6.2.1 Identify center
*6.2.2 Identify vertices
*6.2.3 Find foci
*6.2.4 Find lengths of transverse and conjugate axes
6.2.5 Write equations of asymptotes
*6.2.6 Identify and draw asymptotes
6.2.7 Sketch hyperbola
6.3 Graph Equations $Ax^2+Cy^2+Dx+Ey+F=0$ with $A, C \neq 0$, A and C not both positive
*6.3.1 Write equations in $\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1$ or $\frac{(y-k)^2}{a^2}-\frac{(x-h)^2}{b^2}=1$ form
6.3.2 Identify center
6.3.3 Identify vertices
6.3.4 Identify foci
6.3.5 Find length of a latus rectum
6.3.6 Draw asymptotes
6.3.7 Sketch hyperbola
6.4 Solve Problems Involving Hyperbolas

7.0 Transformations

7.1 Simplify $Ax^2+Cy^2+Dx+Ey+F=0$ by a Translation of Axes
7.1.1 Write in one of the forms: $A'x'^2+E'y'=0$, $C'y'^2+D'x'=0$ $A'x'^2+C'y'^2+F=0$
*7.1.2 Identify vertex or vertices
*7.1.3 Identify focus or foci
7.1.4 Find length of latus rectum
7.1.5 Determine asymptotes (if any exist)
7.1.6 Sketch conic
7.2 Simplify $Ax^2+Bxy+Cy^2+Dx+Ey+F=0$ by Rotation of Axes
7.2.1 Find Angle of Rotation
7.2.2 Write Simplified Equation
7.3 Graphs, Addition of Ordinates

GEOMETRY, ANALYTIC

8.0 Polar Coordinates

- 8.1 Rectangular Coordinates to Polar Coordinates
- 8.2 Polar Coordinates to Rectangular Coordinates
- 8.3 Write Rectangular Equations as Equivalent Polar Equations
- 8.4 Write Polar Equations as Equivalent Rectangular Equations
- 8.5 Sketch Graph of Polar Equations
- 8.6 Identify Special Polar Equations From their Graphs: Cardioids, Rose Curves, Leminscates, Spirals, and Limacons

9.0 Parametric Equations

- 9.1 Define Parameter
- 9.2 Write Equations in Parametric Form
- 9.3 Write Parametric Equations in Rectangular Form
- 9.4 Graph Equations

10.0 Higher Degree Equations

- 10.1 Graph Equations Degree Greater than Two
  - 10.1.1 Determine location of asymptotes
  - 10.1.2 Find intercepts
  - 10.1.3 Determine symmetries
  - 10.1.4 Determine limitations on extent of curve
- 10.2 Sketch Graph

PERFORMANCE OBJECTIVES
GEOMETRY, ANALYTIC

Analytic Geometry is designed for students who have completed Algebra II, Geometry, and Trigonometry. It is an advanced course utilizing the skills of the preceding courses. Analytic Geometry is an excellent course to prepare students for the study of the Calculus. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Review of Fundamental Concepts

1.1 Students will use the distance formula to compute the distance between two points.

1.2 Given two points , students will determine the slope of the line containing the points.

*1.3 Given two points on a line, students will determine the angle of inclination of the line (to nearest degree).

*1.4 Given two intersecting lines, students will determine the angle between the lines (to nearest degree).

*1.5 Given the end points of a segment and specified conditions, students will find the required division points, including midpoint and trisection points.

1.6 Students will prove appropriate geometric theorems by analytic methods.

1.7 Students will graph relations when given linear and quadratic equations.

1.8 Students will write equations of relations when given appropriate information.

2.0 Lines

*2.1 Students will recognize linear equations when written in: (1) Ax+By+C = 0 form, (2) intercept form, (3) slope-intercept form, or (4) point-slope form.

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*Indicates Minimum Level Skills

2.2 Students will write equations of lines when given appropriate information.

*2.3 Students will compute distances from lines to points when given the equations of lines and coordinates of the points.

2.4 To demonstrate knowledge of families of lines, students will:

*(1) select equations representing a family of lines meeting specified conditions and

(2) write equations representing a family of lines when given appropriate information.

2.5 Students will solve problems involving parallel lines and perpendicular lines.

3.0 Circles

3.1 Students will define circle.

3.2 Students will write equations of circles when given (1) the center and the radius or (2) three points.

*3.3 Students will determine the centers and radii of circles when given equations in $x^2+y^2+Dx+Ey+F = 0$ form.

*3.4 Students will select equations of circles that satisfy certain conditions.

*3.5 Students will solve problems involving circles and lines.

3.6 Students will write the equations of families of circles through intersections of specified circles.

4.0 Parabolas

4.1 Students will define parabola.

4.2 To graph equations of the $y^2 = 4ax$ or $x^2 = 4ay$ form, students will:

*(1) identify the focus;

(2) write the equation of the directrix;

*(3) find the length of the latus rectum; and

(4) sketch the graph of the parabola.

4.3 To graph equations of the $x^2+Dx+Ey+F = 0$ or $y^2+Dx+Ey+F = 0$ form, students will:

- *(1) identify the vertex;
- *(2) identify the focus;
- (3) determine the axis of symmetry;
- *(4) find the length of the latus rectum;
- (5) write the equation of the directrix; and
- (6) sketch the graph of the parabola.

*4.4 Students will select equations of parabolas that satisfy given conditions.

4.5 Students will write equations of parabolas when given appropriate information.

5.0 Ellipses

5.1 Students will define ellipse.

5.2 To graph equations given of the $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ or $\frac{y^2}{a^2} + \frac{x^2}{b^2} = 1$ form, students will:

- *(1) identify the center of the ellipse;
- *(2) identify the vertices;
- *(3) find the foci;
- *(4) find the lengths of the major and minor axes;
- *(5) find the length of a latus rectum; and
- (6) sketch the graph of the ellipse.

5.3 To graph equations of the $Ax^2+Cy^2+Dx+Ey+F = 0$ form with $A \neq C$, $A > 0$, and $C > 0$, students will:

- (1) write the equation in

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1 \quad \text{or} \quad \frac{(y-k)^2}{a^2} + \frac{(x-h)^2}{b^2} = 1 \quad \text{form}$$

- *(2) identify the center of the ellipse;

*(3) identify the vertices;

(4) find the length of the latus rectum;

*(5) find the foci;

*(6) find the lengths of the major and minor axes, and

(7) sketch the graph of the ellipse.

5.4 Students will solve problems involving properties of ellipses.

6.0 Hyperbolas

6.1 Students will define hyperbola.

6.2 Given equations in the $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ or $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$ form, students will:

*(1) identify the center of the hyperbola;

*(2) identify the vertices;

*(3) find the foci;

*(4) find the lengths of the transverse and conjugate axes;

(5) write the equations of the asymptotes;

*(6) select the correct equations or correct sketch representing the asymptotes; and

(7) sketch the graph of the hyperbola.

6.3 Given an equation in $Ax^2+Cy^2+Dx+Ey+F = 0$ form with $A \neq 0$, $C \neq 0$, and A, C not both positive, students will:

*(1) write equations in

$$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1 \text{ or } \frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1 \text{ form}$$

(2) identify the center of the hyperbola;

(3) identify the vertices;

(4) identify the foci;

(5) find lengths of the latus rectum;

(6) draw the asymptotes; and

(7) sketch the graph of hyperbola.

6.4 Students will solve problems involving properties of hyperbolas.

7.0 Transformations

7.1 To simplify $Ax^2+Cy^2+Dx+Ey+F = 0$, by a translation of axes, students will:

(1) write given equations in

$A'x'^2+E'Y' = 0$

$C'Y'^2+D'x' = 0$, or

$A'x'^2+C'Y'^2+F = 0$ form;

*(2) identify the vertex or vertices;

*(3) identify the focus or foci;

(4) find the length of a latus rectum;

(5) determine the asymptotes (if any exist); and

(6) sketch the graph of the conic.

7.2 To simplify $Ax^2+Bxy+Cy^2+Dx+Ey+F = 0$ by a rotation of axes so that $B = 0$, students will:

(1) find the angle of rotation using $\tan 2\theta = \frac{B}{A-C}$, if $A \neq C$, and

(2) write the given equation with reference to the new axis

(x',y') using the conversion formulas $x = x'$

$x = x' \cos\theta - y' \sin\theta$ and

$y = x' \sin\theta + y' \cos\theta$.

7.3 Students will sketch the graphs of conics using the addition of ordinates method.

8.0 Polar Coordinates

8.1 Students will convert rectangular coordinates to polar coordinates.

8.2 Students will convert polar coordinates to rectangular coordinates.

8.3 Students will write equations in polar form when given equations expressed in rectangular form.

8.4 Students will write equations in rectangular form when given equations expressed in polar form.

8.5 Students will sketch the graphs of polar equations.

8.6 Students will identify the graphs of cardioids, rose curves, lemniscates, spirals, and limaçons.

9.0 Parametric Equations

9.1 Students will define parameter.

9.2 Students will write equations in parametric form when given appropriate information.

9.3 Students will write a pair of parametric equations in rectangular form by eliminating the parameter.

9.4 Students will graph equations using a parameter.

10.0 Higher Degree Equations

10.1 Given equations of degree greater than two, students will:

(1) determine the location of asymptotes (if any),

(2) find all intercepts,

(3) determine all apparent symmetries, and

(4) determine limitations or extent of curves represented by equations.

10.2 Students will sketch the graphs of equations of degree greater than two.

INTRODUCTION
LIBERAL ARTS MATH I

State Accreditator Number	2265
Course Code Number	1710
F.T.E. Category	1.10
Instructional Level	STANDARD

Report Card Abbreviation	LIB ARTS MATH 1
Length of Course	Year
Credit	1 Math Credit
Grade Level	10,11,12

Prerequisites

Mastery of Minimum Level Skills of Algebra I/Math Teacher Recommendation

Textbook(s)

Dolciani, Mary P., et al, Algebra: Structure and Method, Book One (Boston: Houghton Mifflin, 1979).

Jurgensen, Ray C., et al, Geometry (Boston: Houghton Mifflin, 1980).

Notes to Teachers

Students will master the concepts and skills developed for Liberal Arts Math I as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

State Assessment objectives are indicated by the symbol o̍.
Stanford Achievement objectives are indicated by the symbol #.

LIBERAL ARTS MATH I

- 1.0 Variable Expressions/Open Sentences
  - *1.1 Simplify Numerical Expressions
    - 1.1.1 Grouping symbols
    - 1.1.2 Order of operations
  - *1.2 Evaluate Variable Expressions
  - 1.3 Change from Standard Notation to Exponential Notation
  - # *1.4 Evaluate Exponential Expressions
  - *1.5 Translate to Mathematical Symbols
    - 1.5.1 Word phrases
    - # 1.5.2 Word sentences
- *2.0 Operations on Rational Numbers
  - # 2.1 Add Integers
  - 2.2 Subtract Integers
  - 2.3 Multiply Integers
  - 2.4 Determine Reciprocals
  - 2.5 Divide Integers
- 3.0 Linear Equations: One Variable
  - # *3.1 Solve: Variable in One Member
    - 3.1.1 Addition property of equality
    - 3.1.2 Multiplication property of equality
    - 3.1.3 Addition/ Multiplication combined
  - # *3.2 Solve: Variable in Both Members
  - # 3.3 Solve Word Problems
    - *3.3.1 Number
    - 3.3.2 Consecutive integer
    - 3.3.3 Age
    - 3.3.4 Perimeter
    - *3.3.5 Coin
    - 3.3.6 Uniform motion
- 4.0 Polynomials
  - *4.1 Add/Subtract Polynomials
  - *4.2 Multiply Polynomials
    - 4.2.1 Products of monomials
    - 4.2.2 Powers of monomials
    - 4.2.3 Products of monomials/ polynomials
    - 4.2.4 Products of polynomials
    - 4.2.5 Powers of binomials
  - *4.3 Divide Polynomials
    - 4.3.1 Monomial by monomial
    - 4.3.2 Polynomial by monomial
  - # 4.4 Identify Prime/Composite Numbers
  - 4.5 Write Prime Factorization
  - *4.6 Factor Polynomials
    - 4.6.1 Greatest monomial factor
    - 4.6.2 Difference of squares
    - 4.6.3 Trinomial squares
    - 4.6.4 Trinomials: non squares
    - 4.6.5 Grouping
    - 4.6.6 Combined methods
  - 4.7 Solve Equations by Factoring
- 5.0 Rational Expressions
  - 5.1 Simplify Rational Expressions
    - 5.1.1 Factoring
    - 5.1.2 Long division

* Indicates Minimum Level Skills Test
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

LIBERAL ARTS MATH I

- # 5.2 Express Ratio of Two Quantities
- *5.3 Multiply/Divide Algebraic Expressions
- # *5.4 Add/Subtract Algebraic Expressions
- 5.5 Simplify Complex Fractions
- 5.6 Solve Fractional Equations
- # 5.7 Solve Word Problems
  - 5.7.1 Percentage
  - 5.7.2 Mixture
  - 5.7.3 Work

6.0 Inequalities: One Variable

- 6.1 Use Order Symbols
- *6.2 Determine Solution Sets
  - 6.2.1 Linear inequalities
  - 6.2.2 Compound linear inequalities
- 6.3 Graph Solution Sets
  - 6.3.1 Linear inequalities
  - 6.3.2 Compound linear inequalities
- # 6.4 Describe Relationships of Sets
  - 6.4.1 Intersection/Union
  - 6.4.2 Venn diagrams

7.0 Functions/Relations

- 7.1 State Domain/Range
- 7.2 Determine Values of Functions
- 7.3 Graph on Coordinate Plane
  - 7.3.1 Ordered pairs
  - 7.3.2 Linear equations
  - 7.3.3 Linear inequalities
- 7.4 Identify Functions
  - 7.4.1 Sets of points
  - 7.4.2 Graphs

8.0 Slope/Equations of Lines

- # *8.1 Determine Slope
  - 8.1.1 Two points
  - 8.1.2 Equation of a line
- *8.2 Determine Y-Intercept
- 8.3 Graph Lines Using Slope
  - 8.3.1 Point-slope
  - 8.3.2 Slope-intercept
- *8.4 Determine Linear Equations
  - 8.4.1 Point-slope
  - 8.4.2 Two points
  - 8.4.3 Slope-intercept

9.0 Systems of Linear Equations

- 9.1 Solve Systems
  - 9.1.1 Graphing
  - 9.1.2 Substitution
  - *9.1.3 Linear combination
- 9.2 Solve Word Problems
  - 9.2.1 Number
  - 9.2.2 Perimeter
  - 9.2.3 Coin
  - 9.2.4 Digit
  - 9.2.5 Age
  - 9.2.6 Uniform motion

10.0 Radicals

- *10.1 Simplify Square Root Expressions
  - 10.1.1 Perfect squares
  - 10.1.2 Not perfect squares
- *10.2 Perform Fundamental Operations
- 10.3 Solve Radical Equations

11.0 Quadratic Equations

- 11.1 Solve by Completing the Square
- 11.2 Solve by Quadratic Formula

LIBERAL ARTS MATH I

12.0 Basic Language of Geometry

- *12.1 Identify Undefined Terms
    - 12.1.1 Point
    - 12.1.2 Line
    - 12.1.3 Plane
- 12.2 State Postulates/Theorems: Points/Line/Planes
- 12.3 Define Line Segment
- 12.4 Identify Related Terms: Line Segment
    - 12.4.1 Midpoint
    - 12.4.2 Congruent
    - 12.4.3 Bisector
    - 12.4.4 Betweenness
- 12.5 Define Ray
- 12.6 State Theorems: Segments/Rays
- 12.7 Solve Problems: Segments/Rays

13.0 Angles

- 13.1 Define Angle
- * 13.2 Identify Related Terms
    - 13.2.1 Congruent
    - 13.2.2 Adjacent
    - 13.2.3 Interior/Exterior
    - 13.2.4 Bisector
- 13.3 Measure Angles
- *13.4 Identify Types of Angles/Angle Relationships
    - # 13.4.1 Acute/Right/Obtuse
    - 13.4.2 Complementary/Supplementary
    - 13.4.3 Vertical
- 13.5 Define Perpendicular Lines
- 13.6 State Postulates/Theorems
- 13.7 Solve Problems: Angles/Angle Relationships

14.0 Parallel Lines/Planes

- 14.1 Define Parallel Lines/Planes
- *14.2 Identify Related Terms
    - 14.2.1 Skew lines
    - 14.2.2 Transversals
    - 14.2.3 Corresponding angles
    - 14.2.4 Alternate interior angles
    - 14.2.5 Alternate exterior angles
    - 14.2.6 Interior angles on the same side of transversal
- 14.3 State Postulates/Theorems
- 14.4 Solve Problems: Parallel Lines

15.0 Polygons

- 15.1 Define Triangle
- 15.2 Identify Related Terms: Triangle
    - 15.2.1 Exterior angles
    - 15.2.2 Remote interior angles
- 15.3 Classify Triangles
    - 15.3.1 By sides
    - 15.3.2 By angles
- 15.4 State Theorems: Triangles
- 15.5 Solve Problems: Triangles
- ó*15.6 Identify Polygons
    - 15.6.1 Triangles
    - 15.6.2 Quadrilaterals
    - 15.6.3 Pentagons
    - 15.6.4 Hexagons
    - 15.6.5 Heptagons
    - 15.6.6 Octagons
    - 15.6.7 Nonagons
    - 15.6.8 Decagons

LIBERAL ARTS MATH I

16.0 Perimeters/Areas

- 16.1 Compute Perimeter/Circumference
  - 16.1.1 Parallelograms
  - 16.1.2 Squares
  - ♁*16.1.3 Rectangles
  - 16.1.4 Rhombi
  - 16.1.5 Trapezoids
  - 16.1.6 Triangles
  - 16.1.7 Circles
- 16.2 Compute Area
  - 16.2.1 Parallelograms
  - # 16.2.2 Squares
  - #♁*16.2.3 Rectangles
  - # 16.2.4 Rhombi
  - 16.2.5 Trapezoids
  - # 16.2.6 Triangles
  - 16.2.7 Circles

17.0 Right Triangles

- 17.1 Define Right Triangle
- 17.2 Identify Related Terms
  - 17.2.1 Hypotenuse
  - 17.2.2 Legs
- 17.3 State Theorems
  - 17.3.1 Pythagorean theorem/Converse
  - 17.3.2 Special Triangles: 30^{0}- 60^{0}-90^{0}, 45^{0}- 45^{0}-90^{0}
- 17.4 Solve Problems

18.0 Drawings: Straightedge/Compass

- 18.1 Construct Line Segment
  - 18.1.1 Congruent
  - 18.1.2 Perpendicular bisector
- 18.2 Construct Line
  - 18.2.1 Perpendicular line: point on line
  - 18.2.2 Perpendicular line: point outside line
  - 18.2.3 Parallel line: point outside line
- 18.3 Construct Angle
  - 18.3.1 Congruent
  - 18.3.2 Bisector

PERFORMANCE OBJECTIVES
LIBERAL ARTS MATH I

Liberal Arts Math I provides a course of study for the student who needs increased knowledge and skills in the field of mathematics before continuing in the academic mathematics sequence. The course includes a review of algebra and an introduction to geometry. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Variable Expressions and Open Sentences

*1.1 Students will simplify numerical expressions by using:

(1) grouping symbols; and

(2) the order of operations.

*1.2 Students will evaluate variable expressions when given values of the variables.

1.3 Students will change expressions from standard notation to exponential notation.

*1.4 Students will evaluate exponential expressions when given values of the variables.

*1.5 Students will translate:

(1) word phrases into variable expressions; and

# (2) word sentences into equations using appropriate mathematical symbols.

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* Indicates Minimum Level Skills
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

*2.0 Operations on Rational Numbers

# 2.1 Students will add integers.

2.2 Students will subtract integers.

2.3 Students will multiply integers.

2.4 Students will determine reciprocals of specified rational numbers.

2.5 Students will divide integers.

3.0 Linear Equations: One Variable

# *3.1 Students will solve linear equations with variables in one member by using the:

(1) addition property of equality;

(2) multiplication property of equality; and

(3) both addition and multiplication properties of equality.

# *3.2 Students will solve linear equations with variables in both members.

# 3.3 Students will solve word problems including:

*(1) number problems;

(2) consecutive integer problems;

(3) age problems;

(4) perimeter problems;

*(5) coin problems; and

(6) uniform motion problems.

4.0 Polynomials

*4.1 Students will add and subtract polynomials.

*4.2 Students will multiply polynomials finding:

(1) products of monomials;

(2) powers of monomials;

(3) products of monomials and polynomials;

(4) products of polynomials; and

(5) powers of binomials.

*4.3 Students will divide:

(1) monomial by monomial; and

(2) polynomial by monomial.

4.4 Students will identify prime and composite numbers.

4.5 Students will write the prime factorization of whole numbers less than 1,000.

*4.6 Students will factor polynomials with emphasis on the following special cases:

(1) greatest monomial factor;

(2) difference of squares;

(3) trinomial squares;

(4) trinomials, non squares;

(5) grouping; and

(6) combined methods.

4.7 Students will solve equations by factoring.

5.0 Rational Expressions

5.1 Students will simplify rational expressions by:

(1) factoring; and

(2) using long division.

5.2 Students will express ratio of two quantities.

*5.3 Students will multiply and divide algebraic expressions, writing the results in simplified form.

#*5.4 Students will add and subtract algebraic expressions, writing the results in simplified form.

5.5 Students will simplify complex fractions.

5.6 Students will solve fractional equations.

#5.7 Students will solve word problems including:

  δ (1) percentage problems;

  (2) mixture problems; and

  (3) work problems.

6.0 Inequalities: One Variable

6.1 Students will use order symbols to compare numbers.

*6.2 Students will determine solution sets of:

  (1) linear inequalities; and

  (2) compound linear inequalities.

6.3 Students will graph on a number line solution sets of:

  (1) linear inequalities; and

  (2) compound linear inequalities.

#6.4 Students will describe relationships of sets by:

  (1) finding intersection and/or union; and

  (2) using Venn diagrams.

7.0 Functions and Relations

7.1 Students will state the domain and range of specified relations.

7.2 Students will determine values of simple functions.

7.3 Students will graph on a coordinate plane:

  (1) ordered pairs;

(2) linear equations; and

(3) linear equalities.

7.4 Students will identify functions when given:

(1) sets of points; and

(2) graphs.

8.0 Slope and Equations of Lines

*8.1 Students will determine the slope of a line given:

(1) two points on the line; and

(2) an equation of the line.

*8.2 Students will determine the y-intercept of a line given an equation of the line.

8.3 Students will graph lines using:

(1) point-slope; and

(2) slope-intercept.

*8.4 Students will determine an equation of a line in the form Ax + By = C when given:

(1) point on the line and the slope;

(2) two points on the line; and

(3) slope and y-intercept of the line.

9.0 Systems of Linear Equations

9.1 Students will solve systems of linear equations in two variables by:

(1) graphing;

(2) substitution; and

*(3) linear combination.

9.2 Students will solve word problems involving systems of linear equations including:

(1) number problems;

(2) perimeter problems;

(3) coin problems;

(4) digit problems;

(5) age problems; and

(6) uniform motion problems.

10.0 Radicals

*10.1 Students will simplify square root expressions which are:

(1) perfect squares; and

(2) not perfect squares.

*10.2 Students will perform the fundamental operations on radical expressions, writing the results in simplified form.

10.3 Students will solve specified equations containing radicals.

11.0 Quadratic Equations

11.1 Students will solve quadratic equations by completing the square.

11.2 Students will solve quadratic equations using the quadratic formula.

12.0 Basic Language of Geometry

*12.1 Students will identify the undefined terms:

(1) point;

(2) line; and

(3) plane.

12.2 Students will state the postulates and theorems related to points, lines, and planes.

12.3 Students will define line segment.

12.4 Students will identify:

(1) midpoint of a line segment;

(2) congruent line segments;

(3) bisector of a line segment; and

(4) betweenness of points.

12.5 Students will define ray.

12.6 Students will state theorems related to segments and rays.

12.7 Students will solve problems involving segments and rays.

13.0 Angles

13.1 Students will define angle.

*13.2 Students will identify:

(1) congruent angles;

(2) adjacent angles;

(3) interior and exterior regions of an angle; and

(4) bisector of an angle.

13.3 Students will measure angles using a protractor.

*13.4 Students will identify:

(1) acute, right, or obtuse angles;

(2) complementary or supplementary angles; and

(3) vertical angles.

13.5 Students will define perpendicular lines.

13.6 Students will state postulates and theorems related to angles.

13.7 Students will solve problems related to angles and angle relationships including supplementary and complementary angles, vertical angles, angle bisector, and the angle addition postulate.

14.0 Parallel Lines and Planes

14.1 Students will define parallel lines and planes.

*14.2 Students will identify:

(1) skew lines;

(2) transversals;

(3) corresponding angles;

(4) alternate interior angles;

(5) alternate exterior angles; and

(6) interior angles on the same side of the transversal.

14.3 Students will state postulates and theorems related to parallel lines and planes.

14.4 Students will solve problems related to parallel lines.

15.0 Polygons

15.1 Students will define triangle.

15.2 Students will identify:

(1) exterior angles; and

(2) remote interior angles of a triangle.

15.3 Students will classify triangles by:

(1) sides, and

(2) angles.

15.4 Students will state theorems related to triangles.

15.5 Students will solve problems related to triangles.

δ*15.6 Students will identify the following polygons:

(1) triangles;

(2) quadrilaterals;

(3) pentagons;

(4) hexagons;

(5) heptagons;

(6) octagons;

(7) nonagons; and

(8) decagons.

16.0 Perimeters and Areas

16.1 Students will compute the perimeter/circumference when given a labeled figure of:

(1) parallelograms;

(2) squares;

δ*(3) rectangles;

(4) rhombi;

(5) trapezoids;

(6) triangles; and

(7) circles.

16.2 Students will compute the area when given a labeled figure of:

(1) parallelograms;

# (2) squares;

#δ*(3) rectangles;

# (4) rhombi;

(5) trapezoids;

# (6) triangles; and

(7) circles.

17.0 Right Triangles

17.1 Students will define right triangle.

17.2 Students will identify the:

(1) hypotenuse, and

(2) legs of a right triangle.

17.3 Students will state:

(1) the Pythagorean theorem and its converse; and

(2) the special triangle theorems (30^0- 60^0- 90^0, 45^0 - 45^0 - 90^0).

17.4 Students will solve problems requiring the application of the Pythagorean theorem and its converse and the special triangle theorems.

18.0 Drawings with Straightedge and Compass

18.1 Students will construct:

(1) congruent line segments; and

(2) the perpendicular bisector of a line segment.

18.2 Students will construct:

(1) a line perpendicular to a given line at a point on the line;

(2) a line perpendicular to a given line from a point outside the line; and

(3) a line parallel to a given line from a point outside the line.

18.3 Students will construct:

(1) congruent angles; and

(2) the bisector of an angle.

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
LIBERAL ARTS MATH I

Performance Objective		Instructional Implications		Resources	
Number	Topic	Teaching Time	Tested on	County Adopted	Supplementary
1.0	Variable Expressions/ Open Sentences	1 week	MLST SAT	Mary P. Dolciani, et al, Algebra: Structure and Method, Book One (Boston: Houghton Mifflin, 1979), pp. 1-24.	
2.0	Operations on Rational Numbers	1 week	MLST SAT	Dolciani, pp. 35-45, 52-55, 63-72, 78-81.	
3.0	Linear Equations: One Variable	4 weeks	MLST SAT	Dolciani, pp. 48-51, 56-57, 74-77, 82-87, 104-15, 240-41.	
4.0	Polynomials	6 weeks	MLST SAT	Dolciani, pp. 116-30, 139-89.	
5.0	Rational Expressions	5 weeks	SSAP SAT	Dolciani, pp. 197-245.	
6.0	Inequalities: One Variable	1 week	SAT MLST	Dolciani, pp. 255-78.	
7.0	Functions/ Relations	1 week		Dolciani, pp. 287-90, 296-314, 360-63.	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
LIBERAL ARTS MATH I

Performance Objective		Instructional Implications		Resources	
Number	Topic	Teaching Time	Tested on	County Adopted	Supplementary
8.0	Slope/ Equations of Lines	3 weeks	SAT MLST	Dolciani, pp. 315-25.	
9.0	Systems of Linear Equations	2 weeks	MLST	Dolciani, pp. 337-59.	
10.0	Radicals	2 weeks	MLST	Dolciani, pp. 382-92, 398-407.	
11.0	Quadratic Equations	2 weeks		Dolciani, pp. 432-41.	
12.0	Basic Language of Geometry	3 days	MLST	Ray C. Jurgensen, et al, Geometry (Boston: Houghton Mifflin, 1975), pp. 1-76.	
13.0	Angles	1 week	MLST SAT	Jurgensen, pp. 37-61,64.	
14.0	Parallel Lines/Planes	4 days	MLST	Jurgensen, pp. 77-82, 89-95.	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
LIBERAL ARTS MATH I

Performance Objective		Instructional Implications		Resources	
Number	Topic	Teaching Time	Tested on	County Adopted	Supplementary
15.0	Polygons	3 days	MLST SSAP	Jurgensen, pp. 96-107.	
16.0	Perimeters/ Areas	2 weeks	MLST SSAP SAT	Jurgensen, pp. 198,311-17, 322-27.	
17.0	Right Triangles	4 days		Jurgensen, pp. 97,125, 237-39, 242-45.	
18.0	Drawings: Straightedge/ Compass			Jurgensen, pp. 350-57.	

INTRODUCTION
LIBERAL ARTS MATH II

State Accreditator Number	2265
Course Code Number	1711
F.T.E. Category	1.10
Instructional Level	Standard
Report Card Abbreviation	LIB ARTS MATH 2
Length of Course	Year
Credit	1 Math Credit
Grade Level	11, 12

Prerequisites

Algebra 1 completed/D average in Algebra II and/or Geometry/ Math Teacher Recommendation

Textbook(s)

Everett, Beverly G., Senior Math (Jacksonville: Duval County School Board, 1975).

Notes to Teachers

Students will master the concepts and skills developed for Liberal Arts Math II as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

LIBERAL ARTS MATH II

1.0 Sets

- *1.1 Describe Sets
    - 1.1.1 Rule method
    - 1.1.2 Roster method
    - 1.1.3 Set-builder notation
- *1.2 Identify Types of Sets
    - 1.2.1 Finite or infinite
    - 1.2.2 Well-defined
    - 1.2.3 Null
    - 1.2.4 Subset
    - 1.2.5 Equal
    - 1.2.6 Disjoint
- *1.3 Perform Operations with Sets
    - 1.3.1 Complement
    - 1.3.2 Union
    - 1.3.3 Intersection
- 1.4 Draw Venn Diagrams
    - 1.4.1 Complement
    - 1.4.2 Union
    - 1.4.3 Intersection

2.0 Number Systems

- *2.1 Identify Different Number Systems
    - 2.1.1 Real/rational
    - 2.1.2 Real/irrational
    - 2.1.3 Imaginary
- *2.2 Identify Properties of Number Systems
    - 2.2.1 Addition
    - 2.2.2 Multiplication
    - 2.2.3 Multiplication over addition
    - 2.2.4 Equality
    - 2.2.5 Closure
- *2.3 Convert Repeating Decimals to Fractions
- *2.4 Perform Operations with Square Roots
    - 2.4.1 Simplification
    - 2.4.2 Addition
    - 2.4.3 Subtraction
    - 2.4.4 Multiplication
    - 2.4.5 Division
    - ▽ 2.4.6 Extraction of square roots

3.0 Relations/Functions

- *3.1 Identify
    - 3.1.1 Sets of ordered pairs
    - 3.1.2 Graphs
- *3.2 State Domain/Range
- *3.3 Determine Values of Functions

4.0 Number Series

- 4.1 Determine Rule for nth Term
- 4.2 Compute Values for Arithmetic/ Sequences/Series
    - 4.2.1 Specific terms
    - 4.2.2 Missing terms
    - 4.2.3 Common differences
    - 4.2.4 Number of terms
    - 4.2.5 Sum
- 4.3 Compute Values for Geometric Sequences/Series
    - 4.3.1 Specific terms
    - 4.3.2 Missing terms
    - 4.3.3 Common factors
    - 4.3.4 Number of terms
    - 4.3.5 Sum

5.0 Algebra Review

- *5.1 Translate Words into Algebraic Symbols
    - 5.1.1 Expressions
    - 5.1.2 Open sentences
- *5.2 Find Absolute Value
- 5.3 Perform Operations with Signed Numbers
    - 5.3.1 Addition
    - 5.3.2 Subtraction
    - 5.3.3 Multiplication
    - 5.3.4 Division
- *5.4 Evaluate Algebraic Expressions
- 5.5 Solve Open Sentences, 1 Variable
    - *5.5.1 Equations
    - 5.5.2 Verbal Problems
- 5.6 Solve Proportions

*Indicates Minimum Level Skills

▽ Indicates not Minimum Level Skills

LIBERAL ARTS MATH II

- *5.7 Solve Inequalities, 1 Variable
- 5.8 Graph on a Number Line
  - 5.8.1 Equations
  - 5.8.2 Inequalities
- *5.9 Graph Linear Equations, 2 Variables
  - 5.9.1 Plotting points
  - 5.9.2 Slope-intercept
- *5.10 Graph Inequalities, 2 Variables
- 5.11 Solve Systems of Linear Equations, 2 Variables
  - 5.11.1 Graphing
  - *5.11.2 Linear combination
  - *5.11.3 Substitution
  - 5.11.4 Determinants
- *5.12 Multiply Binomials
- *5.13 Factor Second-Degree Trinomials
- 5.14 Solve Quadratic Equations
  - *5.14.1 Factoring
  - 5.14.2 Completing the square
  - *5.14.3 Quadratic formula

6.0 Exponents

- *6.1 Perform Operations with Rational Exponents
  - 6.1.1 Multiplication
  - 6.1.2 Division
- *6.2 Express in Scientific Notation
  - 6.2.1 Decimal to scientific
  - 6.6.2 Scientific to decimal

7.0 Logarithms

- *7.1 Convert Equations
  - 7.1.1 Exponential to logarithmic
  - 7.1.2 Logarithmic to exponential
- *7.2 Solve Logarithmic Equations
- 7.3 Use Table of Logs
  - 7.3.1 Common logs, 3-significent digits
  - 7.3.2 Antilogs correct to 3-significant digits
- 7.4 Compute Operations with Logs
  - 7.4.1 Multiplication
  - 7.4.2 Division
  - 7.4.3 Powers

8.0 Logic

- 8.1 Draw Euler Diagrams
- 8.2 Determine Types of Statements
  - 8.2.1 Equivalent
  - 8.2.2 Contradictory
- 8.3 Determine Truth of Compound Sentences
  - 8.3.1 Conjunction
  - 8.3.2 Disjunction
- 8.4 Define Negation
- 8.5 Write Forms of Implication
  - 8.5.1 Converse
  - 8.5.2 Inverse
  - 8.5.3 Contrapositive
- 8.6 Complete Truth Tables

9.0 Computer Math

- 9.1 Perform Binary-Decimal Conversion
- 9.2 Convert Decimal Nos. to Other Bases
- 9.3 Perform Binary Arithmetic
  - 9.3.1 Addition
  - 9.3.2 Subtraction
- 9.4 Demonstrate Binary-Octal Conversion

10.0 Linear Programming

- 10.1 Graph System of Constraints
- 10.2 Determine Max-Min Value of Constant Equation

LIBERAL ARTS MATH II

- 10.3 Develop System of Constraints
- 10.4 Solve Linear Programming Problem

11.0 Right Triangle Relationships

- *11.1 Apply Pythagorean Theorem
  - 11.1.1
  - 11.1.2 Two legs
- 11.2 Solve 30-60-90° △s
  - 11.2.1 Short leg
  - 11.2.2 Long leg
  - 11.2.3 Hypotenuse
- 11.3 Solve 45-45-90° △s
  - 11.3.1 One leg
  - 11.3.2 Hypotenuse
- 11.4 Apply Distance Formula
  - *11.4.1 Two points
  - 11.4.2 Right △s
  - 11.4.3 Isosceles △s

12.0 Trigonometry

- *12.1 Locate Terminal Side of ∠s
  - 12.1.1 Angle rotation
  - 12.1.2 Quadrant location
- *12.2 Define Trig Functions Using Rt. △s
- *12.3 Find Trig Functions Using Rt. △s
- 12.4 Apply Trig Functions of Special ∠s : 0°, 30°, 45°, 60°, 90°
- 12.5 Determine Co-functions
- 12.6 Determine Reciprocally-Related Functions
- 12.7 Prove Identities
  - 12.7.1 Reciprocally-related functions
  - 12.7.2 Quotient relations
  - 12.7.3 Pythagorean relations
- 12.8 Compute Sums/Differences of ∠s
- 12.9 Compute Values of Double ∠s
- 12.10 Find Trig Functions, Using Tables
  - *12.10.1 Whole-degree ∠s
  - 12.10.2 Interpolation of ∠s, degrees minutes
- 12.11 Find Arc-Functions, Using Tables
  - *12.11.1 Whole Degree ∠s
  - 12.11.2 Interpolation, degrees/minutes
- 12.12 Perform Triangle Applications
  - 12.12.1 Right △s
  - 12.12.2 Verbal problems
- 12.13 Perform Degree-Radian Conversion
- 12.14 Graph Simple Trig Functions
  - 12.14.1 Sine
  - 12.14.2 Cosine
  - 12.14.3 Tangent
- 12.15 Determine for Trig Functions
  - 12.15.1 Amplitude
  - 12.15.2 Frequency
  - 12.15.3 Period/degrees/radians
  - 12.15.4 Sketch curve

13.0 Statistics

- *13.1 Compute Measures of Central Tendency
  - 13.1.1 Arithmetic mean
  - 13.1.2 Median
  - 13.1.3 Mode
- 13.2 Draw Frequency Graphs

LIBERAL ARTS MATH II

14.0 Probability

- 14.1 Apply Fundamental Principle of Choice
- 14.2 Evaluate Permutations
  - 14.2.1 $_nP_n$
  - 14.2.2 $_nP_r$
  - 14.2.3 $_nP_n$, some elements repeated
- 14.3 Evaluate Combinations
- 14.4 Determine Probability

PERFORMANCE OBJECTIVES
LIBERAL ARTS MATH II

Liberal Arts Math II provides a course of study for college-bound high school seniors who do not have the proficiency required for advanced math courses. The course includes a review of algebra and selected advanced topics such as trigonometry, logic statistics, and probability. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Sets

*1.1 Students will describe sets by (1) the rule method, (2) the roster method, and (3) set-builder notation.

*1.2 Students will identify (1) finite and infinite sets, (2) well-defined sets, (3) null sets, (4) subsets of given sets, (5) equal sets, and (6) disjoint sets.

*1.3 Students will perform operations with sets to determine (1) the complement of a set, (2) the union of sets, and (3) the intersection of sets.

1.4 Students will draw Venn diagrams to illustrate (1) complements, (2) unions, and (3) intersections of sets.

2.0 Number Systems

*2.1 Students will identify numbers as (1) real and rational, (2) real and irrational, and (3) imaginary.

*2.2 Students will identify the properties of different number systems under (1) addition, (2) multiplication, (3) multiplication over addition, (4) equality, and (5) closure.

*2.3 Students will convert repeating decimals to common fractions.

*2.4 Students will perform the following operations with square roots: (1) simplification, (2) addition, (3) subtraction, (4) multiplication, (5) division, and (6)∇ extraction of roots.

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*Indicates Minimum Level Skills

∇ Indicates not Minimum Level Skills

3.0 Relations & Functions

*3.1 Students will identify relations as functions (1) from sets of ordered pairs and (2) from graphs.

*3.2 Students will determine the domain and range of relations and functions.

*3.3 Students will determine the values of a function.

4.0 Number Series

4.1 Students will determine the rule for the nth term of a given series.

4.2 Students will compute the following for arithmetic sequences and series: (1) specific terms, (2) missing terms, (3) common differences, (4) the number of terms, and (5) the sum of the series.

4.3 Students will compute the following for geometric sequences and series: (1) specific terms, (2) missing terms, (3) common factors, (4) the number of terms, and (5) the sum of the series.

5.0 Algebra Review

*5.1 Students will translate words into algebraic symbols forming (1) expressions and (2) open sentences.

*5.2 Students will find the absolute value of simple numerical expressions.

5.3 Students will perform the operations of (1) addition, (2) subtraction, (3) multiplication, and (4) division with signed numbers.

*5.4 Students will evaluate algebraic expressions.

5.5 Students will solve:

*(1) first-degree equations in one variable and

(2) verbal problems involving use of equations in one variable.

5.6 Students will solve proportions using the product of the means and extremes.

*5.7 Students will solve first-degree inequalities in one variable.

5.8 Students will graph the solution set of (1) first-degree equations and (2) first-degree inequalities on the number line.

*5.9 Students will graph linear equations in two variables (1) by plotting at least three points and (2) by the slope-intercept method.

*5.10 Students will graph linear inequalities in two variables.

5.11 Students will solve systems of linear equations in two variables by:

(1) graphing,

*(2) linear combination,

*(3) substitution, and

(4) determinants.

*5.12 Students will multiply binomials.

*5.13 Students will factor second-degree trinomials.

5.14 Students will solve quadratic equations by:

*(1) factoring,

(2) completing the square, and

*(3) quadratic formula.

6.0 Exponents

*6.1 Students will perform the operations of (1) multiplication and (2) division of numbers with rational exponents.

*6.2 Students will express (1) decimal numbers in scientific notation and (2) numbers written in scientific notation in decimal form.

7.0 Logarithms

*7.1 Students will convert (1) exponential equations to logarithmic form and (2) logarithmic equations to exponential form.

*7.2 Students will solve logarithmic equations of the form $\log_x a = n$ for a, n, or x.

7.3 Students will use logarithm tables to find: (1) common logarithms of numbers with three significant digits and (2) antilogarithms correct to three significant digits.

7.4 Students will compute using logarithms the operations of (1) multiplication, (2) division, and (3) raising to a power.

8.0 Logic

8.1 Students will draw Euler diagrams.

8.2 Students will determine if given statements are (1) equivalent or (2) contradictory.

8.3 Students will determine the truth of given (1) conjunctions and (2) disjunctions.

8.4 Students will define negation.

8.5 Students will write the (1) converse, (2) inverse, and (3) contrapositive of given implications.

8.6 Students will complete truth tables..

9.0 Computer Math

9.1 Students will perform the following conversions: binary numbers to decimal numbers and decimal numbers to binary numbers.

9.2 Students will convert decimal numbers to numbers in bases less than 10 and numbers in bases less than 10 to decimal numbers.

9.3 Students will perform (1) addition and (2) subtraction of binary numbers.

9.4 Students will demonstrate the conversion of binary numbers to octal numbers and octal numbers to binary numbers.

10.0 Linear Programming

10.1 Students will graph a system of constraint equations.

10.2 Students will determine the maximum or minimum value of a constant equation from the graph of a system of constraint equations.

10.3 Students will develop a system of constraint equations from a linear programming problem.

10.4 Students will solve a linear programming problem.

11.0 Right Triangle Relationships

*11.1 Students will apply the Pythagorean Theorem to solve right triangles given: (1) the hypotenuse and one leg and (2) two legs.

11.2 Students will solve 30-60-90° triangles when given: (1) the short leg, (2) the long leg, and (3) the hypotenuse.

11.3 Students will solve 45-45-90° triangles when given: (1) one leg and (2) the hypotenuse.

11.4 Students will apply the distance formula to:

*(1) find the distance between two points,

(2) determine if a triangle is a right triangle, and

(3) determine if a triangle is a isosceles triangle.

12.0 Trigonometry

*12.1 Students will locate the terminal side of an angle in standard position in order to determine: (1) the measure of a rotated angle and (2) the quadrant location of the terminal side.

*12.2 Students will define the six trigonometric functions of an angle using a right triangle.

*12.3 Students will find the values of the six trigonometric functions of an angle using a right triangle.

12.4 Students will apply the values of the trigonometric functions of 0°, 30°, 45°, 60°, and 90°.

12.5 Students will determine the values of the co-functions of a given angle.

12.6 Students will determine the values of the reciprocally-related functions.

12.7 Students will prove identities using the (1) reciprocally-related functions, (2) quotient relations, and (3) Pythagorean relations.

12.8 Students will compute the sums and differences of angles.

12.9 Students will compute the values of double angles.

12.10 Students will use trigonometric tables to find the values of sine, cosine, and tangent of:

*(1) whole-degree angles and

(2) angles correct to degrees and minutes by interpolation.

12.11 Students will use trigonometric tables to find the values of arcsine, arccosine, and arctangent of:

*(1) whole-degree angles and

(2) angles correct to degrees and minutes by interpolation.

12.12 Students will perform applications: (1) to right triangles given one acute angle and a side and (2) to problems involving angles of elevation and depression.

12.13 Students will perform the following conversions: degrees to radians and radians to degrees.

12.14 Students will graph (1) sine, (2) cosine, and (3) tangent functions.

12.15 Students will determine: (1) amplitude, (2) frequency, (3) period in degrees and radians, and (4) sketch the curve for sine, cosine, and tangent functions.

13.0 Statistics

*13.1 Students will compute the (1) arithmetic mean, (2) median, and (3) mode for a given set of data.

13.2 Students will draw a cumulative frequency graph for a given set of data.

14.0 Probability

14.1 Students will apply the Fundamental Principle of Choice to determine the number of ways choices can be made.

14.2 Students will evaluate permutations of (1) n elements taken n at a time, (2) n elements taken r at a time, and (3) n elements taken n at a time with some elements repeated.

14.3 Students will evaluate combinations.

14.4 Students will determine the probability of an event occurring.

INTRODUCTION
MATH V

State Accreditator Number. . 2293
Course Code Number 1725
F.T.E. Category. 1.10
Instructional Level. . . . . Advanced

Report Card Abbreviation . . ADV MATH 5
Length of Course . . . . . . Year
Credit . . . . 1 Math Credit
Grade Level. 12

Prerequisites

A or B average in Algebra II and Trigonometry/Analytic Geometry or currently enrolled in Trigonometry.

Textbook(s)

Allendoerfer, Carl, Fundamentals of Freshmen Mathematics (Hightstown, New Jersey: McGraw-Hill Book Company, 1972).

Notes to Teachers

Students will master the concepts and skills developed for Math V as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

COURSE OUTLINE

MATH V

1.0 Field Properties

- 1.1 Justify Proofs
- 1.2 Prove Theorems

2.0 Algebraic Expressions

- 2.1 Polynomials
  Add, Subtract, Multiply, Divide, Factor
- *2.2 Fractions
  - 2.2.1 Rational expressions
  - 2.2.2 Complex fractions
- *2.3 Exponents
  - 2.3.1 Integral, zero
  - 2.3.2 Rational
- *2.4 Radicals
  Add, Subtract, Multiply, Divide

3.0 Order Properties

- 3.1 Prove Theorems
- 3.2 Solve Inequalities, One Variable
  - *3.2.1 Linear
  - *3.2.2 Quadratic
  - 3.2.3 Rational

4.0 Absolute Value

- 4.1 Prove Theorems Using
  - 4.1.1 Definition
  - 4.1.2 Product, quotient
  - 4.1.3 Triangle inequality
  - 4.1.4 Distance formula
- *4.2 Solve Open Sentences
  - 4.2.1 $|ax + b| = c$
  - 4.2.2 $|ax + b| > c$
  - 4.2.3 $|ax + b| < c$

5.0 Completeness Property

- *5.1 Find Least Upper Bound
- *5.2 Find Greatest Lower Bound

6.0 Functions and Relations

- 6.1 Find Distances between Points
- 6.2 Write Equations For Circles
  - *6.2.1 Center and radius
  - *6.2.2 Three points
  - 6.2.3 Others
- *6.3 Graph Relations
  - 6.3.1 Linear
  - 6.3.2 Absolute value
  - 6.3.3 Quadratic

7.0 Circular Functions

- 7.1 Find Values
- 7.2 Sine, Cosine
  - *7.2.1 Special values
  - 7.2.2 Graph
- 7.3 Prove Identities
  - 7.3.1 Eight fundamental identities
  - 7.3.2 Sum and difference formulas
  - 7.3.3 Double- and half-angle formulas
  - 7.3.4 Reduction formulas
- *7.4 Use Identities and Formulas
  - 7.4.1 Simplify expressions
  - 7.4.2 Evaluate functions

8.0 Linear Functions

- 8.1 Determine Equations For Lines
- *8.2 Solve Systems of Linear Equations
  - 8.2.1 Two variables
  - 8.2.2 Three variables
- 8.3 Find Distance From Point To Line

*Indicates Minimum Level Skills

MATH V

- 8.4 Prove Geometric Theorems

9.0 Quadratic Relations

- 9.1 Solve Equations
  - 9.1.1 Algebraic
  - 9.1.2 Transcendental
  - 9.1.3 Radical
- 9.2 Inequalities
  - 9.2.1 Algebraic
  - 9.2.2 Transcendental
- *9.3 Variations
  - 9.3.1 Direct
  - 9.3.2 Indirect
  - 9.3.3 Joint
- 9.4 Solve Systems
  - 9.4.1 Linear-Quadratic
  - 9.4.2 Quadratic-Quadratic

10.0 Determinants

- *10.1 Evaluate (2nd, 3rd, 4th order)
- 10.2 Solve Systems of Linear Equations

11.0 Permutations and Combinations

- *11.1 Solve Problems Using Fundamental Counting Principles
- 11.2 Permutations
  - 11.2.1 Recognize definition
  - *11.2.2 Simplify permutation notations
  - 11.2.3 Simplify factorial notations
  - 11.2.4 Solve verbal problems
- 11.3 Combinations
  - 11.3.1 Recognize definition
  - *11.3.2 Simplify combination notation
  - 11.3.3 Solve verbal problems

12.0 Binomial Theorem

- 12.1 Expand Binomials
- *12.2 Find Specified Terms

13.0 Mathematical Induction

- 13.1 Verify Formulas
- 13.2 Prove Theorems

14.0 Limits and Continuity

- 14.1 Graph Functions
  - 14.1.1 Greatest integer
  - 14.1.2 Different formulas over subsets of domain
- *14.2 Evaluate Composite Functions
- 14.3 Define Limits and Continuity
- *14.4 Find Limits
- 14.5 Prove Theorems

15.0 Derivatives

- 15.1 Find First Derivative of Polynomial Functions
  - 15.1.1 Definition
  - *15.1.2 Power function rule
- 15.2 Find Tangents and Normals
- 15.3 Find Derivatives of Composite Functions
- 15.4 Find Derivatives of Implicit Functions
- 15.5 Find Second and Third Derivatives

MATH V

16.0 Applications of Differentiations

- *16.1 Determine Critical Values
  - 16.1.1 Maxima
  - 16.1.2 Minima
  - 16.1.3 Inflection points
- 16.2 Graph Polynomial Functions
- 16.3 Solve Verbal Problems
  - 16.3.1 Extreme value
  - 16.3.2 Related rates

17.0 Inverse Functions

- 17.1 Find Inverses
- 17.2 Evaluate Inverse Circular Functions

18.0 Exponential and Logarithmic Functions

- 18.1 Sketch Graphs
- *18.2 Write Inverses
  - 18.2.1 Exponential
  - 18.2.2 Logarithmic
- 18.3 Solve Logarithmic Equations
- 18.4 Compute Using Common Logarithms

19.0 Solutions To Triangles

- 19.1 Solve Right Triangles
- 19.2 Solve Oblique Triangles Using
  - 19.2.1 Law of Sines
  - 19.2.2 Law of Cosines
- 19.3 Solve Verbal Problems
- 19.4 Find Areas

20.0 Complex Numbers

- 20.1 Graph
- 20.2 Convert Between Rectangular and Polar Forms
- 20.3 Find Powers and Roots

21.0 Conic Sections

- 21.1 Write Equations
- 21.2 Graph
- 21.3 Translations and Rotations

22.0 Integration

- 22.1 Evaluate Integrals
- 22.2 Solve Verbal Problems
  - 22.2.1 Acceleration
  - 22.2.2 Area

PERFORMANCE OBJECTIVES
MATH V

Math V is an advanced course designed for college-bound students. It follows Trigonometry/Analytic Geometry, Algebra III/Trigonometry, or Analysis and provides an introduction to Calculus. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Field Properties

1.1 Students will use the field properties to justify statements of given algebraic proofs.

1.2 Students will use the field properties to prove given theorems.

2.0 Algebraic Expressions

2.1 Students will add, subtract, multiply, divide, and factor given polynomials.

*2.2 Students will (1) perform arithmetic operations on rational expressions and (2) simplify complex fractions.

*2.3 Students will simplify expressions with (1) integral or zero exponents and (2) rational exponents.

*2.4 Students will add, subtract, multiply, and divide given radicals.

3.0 Order Properties

3.1 Students will prove theorems by using the order properties.

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*Indicates Minimum Level Skills

3.1 Students will:

*(1) solve linear inequalities;

*(2) solve quadratic inequalities; and

(3) solve rational inequalities in one variable over the set of real numbers.

4.0 Absolute Value

4.1 Students will prove theorems using the (1) definition of absolute value, (2) absolute values of products and quotients, (3) triangle inequality, and (4) distance formula.

*4.2 Students will solve absolute value sentences of the forms: (1) $|ax + b| = c$, (2) $|ax + b| > c$, and (3) $|ax + b| < c$, where a, b, and c are real numbers.

5.0 Completeness Property

*5.1 Students will find the least upper bounds (if they exist) for given sets of numbers.

*5.2 Students will find the greatest lower bounds (if they exist) for given sets of numbers.

6.0 Functions and Relations

6.1 Students will find distances between points.

6.2 Students will write equations for circles when given:

*(1) the center and radius;

*(2) three points; and

(3) other specified conditions.

*6.3 Students will graph (1) linear, (2) absolute value, and (3) quadratic relations.

7.0 Circular Functions

7.1 Given the value of one of the circular functions, students will find values for the remaining functions.

7.2 To demonstrate knowledge of the sine and cosine functions, students will:

- *(1) find the value of the sine and cosine for integral multiples of $\frac{\pi}{6}$, $\frac{\pi}{4}$, and π; and
- (2) graph the sine and cosine functions.

7.3 Students will prove given identities using the (1) eight fundamental identities, (2) sum and difference formulas, (3) double- and half-angle formulas, and (4) reduction formulas.

*7.4 Students will use trigonometric identities and formulas to (1) simplify given expressions and (2) evaluate given functions.

8.0 Linear Functions

8.1 Students will determine equations for specified lines.

*8.2 Students will solve systems of linear equations in (1) two variables and (2) three variables.

8.3 Students will find distances between given points and lines.

8.4 Students will prove given geometric theorems by use of coordinate geometry.

9.0 Nonlinear Relations

9.1 Students will solve (1) algebraic, (2) transcendental, and (3) radical equations.

9.2 Students will solve (1) algebraic and (2) transcendental inequalities.

*9.3 Students will solve problems relating to (1) direct, (2) indirect, and (3) joint variations.

9.4 Students will solve systems of (1) linear-quadratic equations and (2) quadratic-quadratic equations.

10.0 Determinants

*10.1 Students will evaluate second-, third-, and fourth-order determinants with real number entries.

10.2 Students will solve systems of linear equations using determinants.

11.0 Permutations and Combinations

*11.1 Students will solve verbal problems using the Fundamental Counting Principle.

11.2 To demonstrate knowledge of permutations, students will:

(1) recognize the definition of permutation;

*(2) simplify expressions involving permutation notation;

(3) simplify expressions involving factorial notation; and

(4) solve verbal problems relating to permutations.

11.3 To demonstrate knowledge of combinations, students will:

(1) recognize the definition of combination;

*(2) simplify expressions involving combination notation; and

(3) solve verbal problems relating to combinations.

12.0 Binomial Theorem

12.1 Students will expand given binomials.

*12.2 Students will find indicated terms of specified expansions.

13.0 Mathematical Induction

13.1 Students will verify given formulas.

13.2 Students will prove given theorems by method of mathematical induction.

14.0 Limits and Continuity

14.1 Students will graph (1) the greatest integer function and (2) functions having different formulas over different subsets of its domain.

*14.2 Students will evaluate given composite functions.

14.3 Students will state the definitions for (1) limit of a function and (2) continuity.

*14.4 Students will find limits of given functions.

14.5 Students will prove given theorems relating to limits.

15.0 Derivatives

15.1 To demonstrate knowledge of the first derivative of polynomial functions, students will:

(1) find the first derivative using the definition of "slope of a curve" and

*(2) find the first derivative using the power function rule.

15.2 Students will find equations for tangents and normals to given curves at indicated points.

15.3 Students will find first derivatives of given composite functions.

15.4 Students will find first derivatives of given implicit functions.

15.5 Students will find the second and third derivatives of given functions.

16.0 Applications of Differentations

16.1 Given polynomial functions, students will determine the critical values including (1) maxima, (2) minima, and (3) points of inflection.

16.2 Students will graph given polynomial functions.

16.3 Students will solve (1) extreme value and (2) related rate problems.

17.0 Inverse Functions

17.1 Students will find inverses for given functions.

17.2 Students will evaluate inverse circular functions.

18.0 Exponential and Logarithmic Functions

18.1 Students will sketch graphs for equation of the form $\{(x, y): y = a^x\}$, where a is a positive integer greater than one.

*18.2 Given (1) exponential and (2) logarithmic functions, students will write their inverses.

18.3 Students will solve logarithmic equations.

18.4 Students will evaluate given expressions by using common logarithms.

19.0 Solutions to Triangles

19.1 Students will solve given right triangles.

19.2 Students will solve given oblique triangles using (1) the Law of Sines and (2) the Law of Cosines.

19.3 Students will solve verbal problems relating to solution of triangles.

19.4 Students will find areas of given triangles.

20.0 Complex Numbers

20.1 Students will graph given sets of complex numbers on the coordinate plane.

20.2 Students will convert given complex numbers between rectangular and polar forms.

20.3 Students will find powers and roots of given complex numbers.

21.0 Conic Sections

21.1 Students will write equations for specified conic sections when given appropriate information.

21.2 Students will sketch graphs of parabolas, circles, ellipses, and hyperbolas when given equations.

21.3 Students will determine images of given conic sections under specified rotations and translations.

22.0 Integration

22.1 Students will evaluate given integrals.

22.2 Students will solve (1) acceleration and (2) area problems.

INTRODUCTION
MATHEMATICS 7, ADVANCED

State Accreditator Number. . 2211
Course Code Number 1404
F.T.E. Category. 1.00
Instructional . . . . Advanced

Report Card Abbreviation . . ADV MATH 7
Length of Course . . . . . . Year
Credit . . . . 1 Math Credit
Grade Level. 7

Prerequisites

Teacher Recommendation/Computational Skills Above Grade Level/High EST Scores/A or B average.

County Adopted Materials (s)

Dolciani, Mary P., et al, Algebra: Structure and Method, Book One (Atlanta: Houghton Mifflin Company, 1979)

Enrichment and Remediation Program for Individualizing Mathematics Essentials and Applications (Columbus, Ohio: Charles E. Merrill Publishing Company, 1980).

Evaluation and Diagnostic Program for Mathematics Essentials and Applications (Columbus, Ohio: Charles E. Merrill Publishing Company, 1980).

Vanatta, Glen and John H. Stoeckinger, Mathematics Essentials and Applications (Columbus, Ohio: Charles E. Merrill Publishing Company, 1980).

Supplementary Materials(s)

Bramson, Morris, Algebra An Introductory Course (New York: AMSCO School Publications, Inc., 1978).

Computational Skills in Mathematics (New Rochelle, New York: Pathescope Educational Media, Inc., 1976).

8th Grade Mathematics Teacher Manual for Florida State Assessment Program (Duval County Public Schools, 1980).

Individualized Computational Skills Program (Boston, Massachusetts: Houghton Mifflin Company, 1972).

Nichols, Eugene, et al, Holt School Mathematics (New York: Holt, Rinehart and Winston, Inc., 1974).

MATHEMATICS 7, ADVANCED

- 1.0 Whole Numbers
  - #1.1 Read/Write
    - δ 1.1.1 3-digit numbers
    - δ 1.1.2 Between 10,000/10,000,000
  - 1.2 Add
    - #1.2.1 Three 3-digit numbers
    - #δ 1.2.2 Three 4-digit numbers
  - #1.3 Subtract
    - 1.3.1 3-digit numbers
    - δ 1.3.2 5-digit numbers
    - 1.3.3 Consumer skill: meter reading
  - 1.4 Solve Real-World Problems
    - 1.4.1 Addition of two 3-digit numbers
    - 1.4.2 Subtraction of 3-digit numbers
    - δ 1.4.3 Addition/Subtraction of 4-digit numbers
  - 1.5 Compare/Order
    - δ 1.5.1 Numbers less than 10,000
    - 1.5.2 Numbers having at least 5-digits
  - 1.6 Round
    - #1.6.1 Numbers less than 1,000
    - #δ 1.6.2 Numbers less than 10,000
    - δ 1.6.3 Estimation of real-world addition problems
    - δ 1.6.4 Estimation of real-world subtraction problems
  - 1.7 Read Roman Numerals
  - #1.8 Write Expanded Notation
  - 1.9 Multiply
    - #δ 1.9.1 2-digit numbers/3-digit numbers
    - #*1.9.2 3-digit numbers
    - 1.9.3 4-digit numbers/3-digit numbers
  - 1.10 Divide
    - #δ*1.10.1 5-digit numbers by 1-digit/2-digit numbers
    - #δ 1.10.2 3-digit by 2-digit numbers
    - 1.10.3 Whole numbers by 3-digit divisors
  - #1.11 Estimate Product/Quotient
  - 1.12 Solve Real-World Problems
    - δ 1.12.1 Multiplication of 2-digit/3-digit number
    - 1.12.2 Division

- 2.0 Decimals
  - 2.1 Read/Write
    - δ 2.1.1 Decimal fractions through hundredths
    - 2.1.2 Decimal fractions between hundredths/thousandths
  - 2.2 Round
    - #δ 2.2.1 Decimal fractions less than ten to nearest whole number
    - *2.2.2 Decimal fractions through the thousandths place
    - 2.2.3 Decimal fractions to any designated place
  - 2.3 Compare

* Indicates Minimum Level Skills
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

MATHEMATICS 7, ADVANCED

- 2.4 Add
  - ό*2.4.1 Decimal fractions less than 100: no more than three decimal places
  - 2.4.2 Decimal fractions greater than 100: no more than three decimal places
  - 2.4.3 Decimal fractions: no more than four decimal places
- 2.5 Subtract
  - ό*2.5.1 Decimal fractions less than 100: no more than three decimal places
  - 2.5.2 Decimal fractions greater than 100: no more than three decimal places
  - 2.5.3 Decimal fractions: no more than four decimal places
- ό 2.6 Read/Write Money Values
- 2.7 Solva Money Problems
  - 2.7.1 Addition/Subtraction
  - #ό 2.7.2 Real-world purchase problems
  - ό 2.7.3 Equivalent amounts
- 2.8 Estimate Sum/Difference
- 2.9 Identify Metric Prefixes
- 2.10 Convert within Metric System
- 2.11 Multiply
  - #ό 2.11.1 Whole numbers/Decimal fractions: no more than two decimal places
  - ό*2.11.2 Decimal fractions named in tenths/hundredths
  - # 2.11.3 Decimal fractions
- # 2.12 Divide
  - ό 2.12.1 Decimal fractions by whole numbers
  - *2.12.2 Decimal fractions by decimal fractions: restrictions
  - 2.12.3 Decimal fractions by decimal fractions
- ό 2.13 Find Unit Price
- 2.14 Multiply/Divide: Decimal Fractions by 10,100,1000
- ό 2.15 Change Percent to Decimal Fraction
- 2.16 Change Decimal Fraction to Percent
- # *2.17 Find Percent of Number
- # 2.18 Estimate Product/Quotient
- 2.19 Write in Scientific Notation
- 2.20 Write in Standard Form

3.0 Geometry

- 3.1 Identify
  - 3.1.1 Points
  - # 3.1.2 Line segments
  - 3.1.3 Lines
  - 3.1.4 Perpendicular lines
  - 3.1.5 Parallel lines
- 3.2 Identify
  - 3.2.1 Rays
  - #ό 3.2.2 Angles
  - 3.2.3 Planes
- 3.3 Classify Angle Types/Relationships
  - *3.3.1 Acute/Right/Obtuse
  - 3.3.2 Complementary/Supplementary/Vertical

MATHEMATICS 7, ADVANCED

- 3.4 Construct
  - 3.4.1 Congruent line segments
  - 3.4.2 Congruent angles
  - 3.4.3 Parallel lines
  - 3.4.4 Perpendicular rays
- 3.5 Bisect Line Segments/ Angles
- #δ 3.6 Identify/Name Polygons
  - 3.6.1 Triangles
  - 3.6.2 Quadrilaterals
  - 3.6.3 5-8 sided figures

4.0 Factors/Multiples

- 4.1 Find Factors
  - 4.1.1 Numbers divisible by two
  - 4.1.2 Numbers divisible by five
  - 4.1.3 Numbers divisible by ten
  - 4.1.4 Numbers divisible by three
  - 4.1.5 Numbers divisible by nine
- 4.2 Use Sales Tax Table
- 4.3 Classify Whole Numbers
  - # 4.3.1 Prime
  - 4.3.2 Composite
- # 4.4 Find Prime Factorization
- # 4.5 Compute Greatest Common Factor
- # 4.6 Compute Least Common Multiple

5.0 Fractions

- #δ 5.1 Read/Write Fractions
- #δ 5.2 Identify Equivalent Fractions
- # *5.3 Express Fractions in Lowest Terms
- 5.4 Use Insulation Table
- δ 5.5 Identify Improper Fractions as Mixed Numbers
- 5.6 Add/Subtract with Like Denominators
- #δ 5.7 Determine Extraneous Information in Real-World Problems
- 5.8 Compare
- 5.9 Add
  - δ 5.9.1 Proper fractions
  - *5.9.2 Mixed numbers: restricted denominators
  - # 5.9.3 Mixed numbers
- # 5.10 Subtract
  - δ 5.10.1 Proper fractions
  - *5.10.2 Mixed numbers: restricted denominators
  - 5.10.3 Mixed numbers
- 5.11 Add With Aid of Rulers
- 5.12 Change Mixed Numbers to Improper Fractions
- 5.13 Multiply
  - #δ 5.13.1 Two proper/ improper fractions
  - 5.13.2 More than two proper/improper fractions
  - δ 5.13.3 Real-world problems
  - # 5.13.4 Proper fraction/ Whole number
  - *5.13.5 Mixed number/ Whole number
  - *5.13.6 Mixed numbers
- 5.14 State Reciprocal
- 5.15 Divide
  - 5.15.1 Proper fractions
  - 5.15.2 Mixed number by whole number
  - *5.15.3 Mixed number by proper fraction
- δ* 5.16 Change Fractions to Terminating Decimal Fractions

MATHEMATICS 7, ADVANCED

- 5.17 Change Fractions to Repeating Decimal Fractions
- δ*5.18 Change Proper Fractions to Percents
- 5.19 Change Percents to Fractions
- #δ 5.20 Determine Insufficient Information in Real-World Problems

6.0 Probability

- 6.1 Determine Number of Outcomes of an Event
- 6.2 Compare Actual/Expected Probabilities
- # 6.3 Determine Probability of an Outcome
  - 6.3.1 Tree diagrams
  - 6.3.2 Two dice
  - 6.3.3 Multiplication rule
- 6.4 Change Probability to Percent
- 6.5 Change Percent to Probability
- 6.6 Determine Odds
- 6.7 Solve Real-World Problems

7.0 Statistics/Graphing

- 7.1 Determine Measures of Central Tendency
  - 7.1.1 Mode
  - # 7.1.2 Mean
  - 7.1.3 Median
- 7.2 Interpret Information
  - δ*7.2.1 Pictographs
  - δ*7.2.2 Bar graphs
  - # 7.2.3 Line graphs
  - *7.2.4 Circle graphs
- 7.3 Construct Circle Graphs
- δ 7.4 Locate Points on Map
- 7.5 Graph in 1st Quadrant
- 7.6 Compute Averages Using Frequency Tables

8.0 Ratio/Proportion/Percent

- 8.1 Write Ratio as Fraction
- # 8.2 Compute Rate
- 8.3 Find Cross-Products
- 8.4 Find Missing Term
- 8.5 Compare Fractions Using Cross-Products
- # 8.6 Determine Solutions from Scale Drawings
- # 8.7 Solve Percent Problems
  - 8.7.1 a % of b = ___
  - 8.7.2 ___ % of b = c
  - 8.7.3 a % of ___ = c
- 8.8 Solve Real-World Problems
  - 8.8.1 Tax Rate
  - 8.8.2 Discount
  - 8.8.3 Simple interest

9.0 Measurement

- 9.1 Explore Nonstandard Units of Measure
- δ 9.2 Determine Length/Width/Height
- 9.3 Determine Weight
  - δ 9.3.1 Nearest gram or ounce
  - δ 9.3.2 Nearest kilogram or pound
- 9.4 Determine Capacity
  - δ 9.4.1 Teaspoons/Tablespoons/Gallons
  - δ 9.4.2 Milliliters/Liters/Cups/Pints/Quarts

MATHEMATICS 7, ADVANCED

- 9.5 Solve Real-World Problems
  - δ 9.5.1 Weight
  - δ 9.5.2 Capacity
- 9.6 Determine Temperature
  - δ 9.6.1 Fahrenheit/ Celsius
  - 9.6.2 Conversion of temperature readings
- δ 9.7 Tell Time
- 9.8 Compute Time Measures
  - 9.8.1 Conversion
  - 9.8.2 Addition/ Subtraction
  - # 9.8.3 Stopwatch
- 9.9 Measure/Draw Angles
- 9.10 Find Perimeter
  - *9.10.1 Triangles
  - # *9.10.2 Quadrilaterals
  - 9.10.3 Pentagons
- *9.11 Add/Subtract Metric Lengths
- #δ 9.12 Solve Linear Measurement Problems
- 9.13 Compute Payments on Installment Plan
- 9.14 Find Circumference
- 9.15 Find Area
  - # 9.15.1 Rectangles
  - 9.15.2 Parallelograms
  - 9.15.3 Triangles
  - 9.15.4 Circles
  - 9.15.5 Trapezoids
- 9.16 Find Surface Area: Rectangular Prisms
- δ 9.17 Identify Solids
  - 9.17.1 Cubes
  - 9.17.2 Cones
  - 9.17.3 Cylinders
  - 9.17.4 Spheres
- 9.18 Find Volume
  - # 9.18.1 Rectangular prisms
  - 9.18.2 Cylinders
- 9.19 Solve Real-World Measurement Problems

10.0 Integers

- # 10.1 Locate on Number Line
- 10.2 Compare
- 10.3 State Absolute Value/ Opposite
- # 10.4 Add
  - 10.4.1 Number line
  - 10.4.2 Rules for addition
  - *10.4.3 Integers less than 100
  - 10.4.4 Integers greater than 100
- 10.5 Subtract
  - 10.5.1 Number line
  - 10.5.2 Definition
  - *10.5.3 Integers less than 100
  - 10.5.4 Integers greater than 100
- # 10.6 Multiply
  - *10.6.1 Integers less than 100
  - 10.6.2 Integers greater than 100
- 10.7 Divide
  - *10.7.1 Integers less than 100
  - 10.7.2 Integers greater than 100
- 10.8 Graph Ordered Pairs
- 10.9 Interpret Stock Tables

11.0 Triangles

- 11.1 Find Square Roots
  - 11.1.1 Square root table
  - 11.1.2 Approximation
- 11.2 Solve Problems
  - 11.2.1 30°- 60° right triangles
  - 11.2.2 Similar triangles
  - 11.2.3 Pythagorean theorem

MATHEMATICS 7, ADVANCED

12.0 Operations/Properties

- 12.1 Identify: Addition
  - 12.1.1 Commutative
  - #12.1.2 Associative
  - 12.1.3 Identity
  - 12.1.4 Inverse
- 12.2 Identify: Multiplication
  - 12.2.1 Commutative
  - #12.2.2 Associative
  - #12.2.3 Identity
  - 12.2.4 Zero
  - #12.2.5 Distributive

13.0 Equations/Inequalities

- 13.1 Simplify Numerical Expressions
  - 13.1.1 Grouping symbols
  - 13.1.2 Order of operations
- 13.2 Define Terms
  - 13.2.1 Variable
  - 13.2.2 Solution
  - 13.2.3 Open equation
  - 13.2.4 Replacement set
  - 13.2.5 Solution set
- *13.3 Solve Simple Equations
  - 13.3.1 Addition
  - 13.3.2 Multiplication
  - 13.3.3 Addition/Multiplication combined
- #13.4 Solve Simple Inequalities
- #13.5 Graph Solution Set
- #δ*13.6 Translate/Solve Word Problems
- #13.7 Solve Two-Step Word Problems

14.0 Sets

- 14.1 Identify Sets
  - 14.1.1 Empty
  - 14.1.2 Finite
  - 14.1.3 Infinite
- #14.2 Identify Subsets
- 14.3 Draw Venn Diagrams
- *14.4 Find Union
  - 14.4.1 Roster
  - 14.4.2 Rule
  - #14.4.3 Venn diagrams
- *14.5 Find Intersection
  - 14.5.1 Roster
  - 14.5.2 Rule
  - 14.5.3 Venn diagrams

15.0 Operations with Signed Numbers

- 15.1 State Opposites
- 15.2 State Reciprocals
- 15.3 State Absolute Values
- #15.4 Perform Fundamental Operations
- 15.5 Square Whole Numbers
- 15.6 Find Square Roots
  - 15.6.1 Read tables
  - 15.6.2 Estimate

16.0 Equations/Inequalities

- #16.1 Simplify Numerical Expressions
- 16.2 Define Variable
- 16.3 Translate Phrases & Sentences
  - 16.3.1 Word phrases to math phrases
  - 16.3.2 Math phrases to word phrases
  - δ16.3.3 Word sentences to math sentences
- #16.4 Evaluate Phrases

MATHEMATICS 7, ADVANCED

- 16.5 Use Set Language
  - 16.5.1 Replacement set
  - 16.5.2 Solution set
  - 16.5.3 Empty set
- # 16.6 Solve 1st-Degree Equations, 1 Variable
- 16.7 Solve 1st Degree Inequalities, 1 Variable
- 16.8 Solve Ratio & Proportion Problems
- 16.9 Graph on Number Line
  - 16.9.1 Solution sets of equations
  - 16.9.2 Solution sets of inequalities
- 16.10 Solve Verbal Problems
  - 16.10.1 Equations, 1 variable
  - 16.10.2 Inequalities, 1 variable

PERFORMANCE OBJECTIVES
MATHEMATICS 7, ADVANCED

Seventh grade advanced math is intended for above average seventh grade students. It provides selected topics, ranging from whole numbers to integers, which are prerequisite to Algebra I. Successful completion of this course is based on teacher judgement and the requirement that the students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Whole Numbers

# 1.1 Students will read and write:

- δ (1) word names for three-digit whole numbers; and
- δ (2) the numeral representing any whole number from ten thousand to less than ten million.

1.2 Students will add:

- # (1) any three three-digit whole numbers; and
- #δ (2) any three four-digit numbers.

# 1.3 Students will subtract:

- (1) three digit whole numbers;
- δ (2) five-digit whole numbers; and
- (3) meter readings to determine the number of kilowatt hours used.

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* Indicates Minimum Level Skills
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

1.4 Students will solve real-world problems involving:

- (1) addition of two three-digit whole numbers;
- (2) subtraction of three-digit whole numbers; and
- δ (3) addition or subtraction of four-digit numbers.

1.5 Students will compare and order:

- δ (1) any three whole numbers less than 10,000; and
- (2) whole numbers having at least five-digits.

1.6 Students will round:

- # (1) a whole number less than 1,000 to any designated place;
- #δ (2) a whole number less than 10,000 to any designated place;
- δ (3) to the nearest ten, hundred, or thousand when estimating the solution to a real-world addition problem involving up to four-digit numbers; and
- δ (4) to the nearest ten, hundred, or thousand when estimating the solution to a real-world subtraction problem involving up to four-digit numbers.

1.7 Students will read Roman numerals no greater than two thousand.

1.8 Students will write in expanded notation numbers written in standard form and reverse.

1.9 Students will multiply:

- #δ (1) two-digit numbers and three-digit numbers;
- # *(2) two three-digit whole numbers; and
- (3) four-digit numbers by three-digit numbers.

1.10 Students will divide:

#δ*(1) five-digit whole numbers by one- and two-digit whole numbers with remainders;

#δ (2) three-digit numbers by two-digit numbers including multiples of ten less than 100; and

(3) . whole numbers by three-digit divisors.

#1.11 Students will estimate the product or quotient of two whole numbers.

1.12 Students will solve real-world problems involving:

δ (1) multiplication of a two-digit number and a three-digit number; and

(2) division of whole numbers.

2.0 Decimals

2.1 Students will read and write:

δ (1) mixed decimal fractions through hundredths; and

(2) decimal fractions between hundredths and thousandths.

2.2 Students will round:

#δ (1) decimal fractions less than 10, with no more than two decimal places, to the nearest whole number;

*(2) decimal fractions through the thousandths place; and

(3) decimal fractions to any designated place.

2.3 Students will compare decimal fractions using < , > , or = .

2.4 Students will add:

- δ*(1) decimal fractions less than 100 with no more than three decimal places;
- (2) decimal fractions greater than 100 with no more than three decimal places; and
- (3) decimal fractions with no more than four decimal places.

2.5 Students will subtract:

- δ*(1) decimal fractions less than 100 with no more than three decimal places;
- (2) decimal fractions greater than 100 with no more than three decimal places; and
- (3) decimal fractions with no more than four decimal places.

δ 2.6 Students will read and write money values through $1,000.

2.7 Students will solve money problems by determining:

- (1) the sum and difference of given amounts of money;
- #δ (2) the solution to real-world problems involving purchases totaling less than ten dollars with change from a twenty dollar bill; and
- δ (3) equivalent amounts of up to twenty dollars using coins and paper currency.

2.8 Students will estimate the sum and difference of decimal fractions.

2.9 Students will identify metric prefixes.

2.10 Students will convert within the metric system.

2.11 Students will multiply:

#δ (1) whole numbers and decimal fractions having no more than two decimal places;

δ*(2) one- or two- place decimal fractions; and

(3) decimal fractions by decimal fractions or whole numbers, no restrictions.

# 2.12 Students will divide:

δ (1) decimal fractions by one- or two-digit whole numbers including multiples of ten where the quotient is a decimal fraction;

*(2) one-, two-, or three-place decimal fractions by one- or two- place decimal fractions; and

(3) decimal fractions by decimal fractions.

δ 2.13 Students will find unit price when solving real-world problems involving comparison shopping for purchases less than ten dollars.

2.14 Students will multiply or divide decimal fractions by 10, 100, and 1,000.

δ 2.15 Students will change a whole number percent less than 100% to equivalent decimal form.

2.16 Students will change a decimal fraction named in tenths or hundredths to an equivalent percent.

*2.17 Students will find a whole number percent of a whole number.

2.18 Students will estimate the product and quotient of decimal fractions.

2.19 Students will write in scientific notation numbers written in standard form.

2.20 Students will write in standard form numbers written in scientific notation.

3.0 Geometry

3.1 Students will identify:

(1) points;

# (2) line segments;

(3) lines;

(4) perpendicular lines; and

(5) parallel lines.

3.2 Students will identify:

(1) rays;

#6 (2) angles; and

(3) planes.

3.3 Students will classify angle types and relationships as:

*(1) acute, right, or obtuse; and

(2) complementary, supplementary, or vertical.

3.4 Students will construct:

(1) congruent line segments;

(2) congruent angles;

(3) parallel lines; and

(4) perpendicular rays.

3.5 Students will bisect line segments and angles.

#6 3.6 Students will identify and name polygons with emphasis on:

(1) triangles;

(2) quadrilaterals; and

(3) five through eight-sided figures, inclusive.

4.0 Factors and Multiples

4.1 Students will find factors of numbers divisible by:

(1) two, (2) five, (3) ten, (4) three, and (5) nine.

4.2 Students will use a sales tax table to determine the total price of purchases.

4.3 Students will classify whole numbers as:

(1) prime, or

(2) composite.

4.4 Students will find the prime factorization of composite numbers.

4.5 Students will compute the greatest common factor of two numbers.

4.6 Students will compute the least common multiple of two or three numbers.

5.0 Fractions

#ó 5.1 Students will read and write fractions having denominators of 2, 3, 4, 5, 6, 8, 10, 20, 25, 50, or 100.

#ó 5.2 Students will identify a fraction that is equivalent to a given proper fraction having a denominator of 2, 3, 4, 5, 6, 8, 10, 20, 25, 50, or 100.

*5.3 Students will express fractions in lowest terms.

5.4 Students will use an insulation table to arithmetically compare resistances of various insulators (consumer skill).

ó 5.5 Students will identify an improper fraction that is equivalent to a mixed number component less than ten with a fractional component stated in halves, thirds, fourths, fifths, or tenths.

5.6 Students will add and subtract fractions having like denominators.

#ó 5.7 Students will determine whether extraneous information is given in solving a real-world problem having one step.

5.8 Students will compare fractions using >, < , or = .

5.9 Students will add:

- δ (1) two proper fractions having unlike denominators of 2, 3, 4, 5, 6, 8, or 10;
- *(2) mixed numbers with denominators of 2, 3, 4, 5, 6, 8, 10, or 16, regrouping required; and
- # (3) mixed numbers.

5.10 Students will subtract:

- δ (1) two proper fractions having unlike denominators of 2, 3, 4, 5, 6, 8, or 10;
- *(2) mixed numbers with denominators of 2, 3, 4, 5, 6, 8, 10, or 16, regrouping required; and
- (3) mixed numbers.

5.11 Students will add fractions with the aid of rulers.

5.12 Students will change mixed numbers to improper fractions.

5.13 Students will multiply:

- #δ (1) two proper and/or improper fractions;
- (2) more than two proper and/or improper fractions;
- δ (3) proper fractions to determine the solution to real-world problems;
- # (4) a proper fraction and a whole number;
- *(5) a mixed number and a whole number; and
- *(6) two mixed numbers.

5.14 Students will state the reciprocal of a given fraction.

5.15 Students will divide:

- (1) a proper fraction by a proper fraction;
- (2) a mixed number by a whole number; and
- *(3) a mixed number by a proper fraction.

δ*5.16 Students will change fractions to terminating decimal fractions.

5.17 Students will change fractions to repeating decimal fractions.

δ*5.18 Students will change proper fractions to whole number percents.

5.19 Students will change percents to fractions.

#δ 5.20 Students will determine whether insufficient information is given in solving a real-world problem having one step.

6.0 Probability

6.1 Students will determine the number of specific outcomes of an event.

6.2 Students will compare actual and expected probabilities of outcomes.

6.3 Students will determine the probability of outcomes of events by:

(1) making tree diagrams;

(2) rolling two dice; and

(3) using the multiplication rule.

6.4 Students will change a probability to a percent.

6.5 Students will change a percent to a probability.

6.6 Students will determine the odds for an event.

6.7 Students will solve real-world problems using estimation to check for reasonableness.

7.0 Statistics and Graphing

7.1 Students will determine measures of central tendency of data by finding the:

(1) mode;

(2) mean; and

(3) median.

7.2 Students will interpret information illustrated by:

ό*(1) pictographs;

ό*(2) bar graphs;

(3) line graphs; and

*(4) circle graphs.

7.3 Students will construct circle graphs.

ό 7.4 Students will locate points on a highway map.

7.5 Students will graph ordered pairs in the first quadrant.

7.6 Students will compute averages using frequency tables.

8.0 Ratio, Proportion, and Percent

8.1 Students will write a ratio as a fraction in simplest form.

8.2 Students will compute rate.

8.3 Students will find the value of cross-products.

8.4 Students will find the missing term when given proportions having one unknown term.

8.5 Students will compare fractions by using cross-products.

8.6 Students will determine solutions to problems relating to scale drawings.

8.7 Students will solve percent problems including:

(1) a % of b = ______;

(2) ______% of b = c; and

(3) a % of______ = c.

8.8 Students will solve real-world problems involving:

(1) sales tax;

(2) discount; and

(3) simple interest.

9.0 Measurement

9.1 Students will explore nonstandard units of measure.

ó 9.2 Students will determine length, width, or height by measuring objects to nearest centimeter or meter, or 1/4 inch, 1/2 foot, or yard.

9.3 Students will determine weight by measuring to:

ó (1) nearest gram or ounce; or

ó (2) nearest kilogram or pound.

9.4 Students will determine capacity by measuring quantities in:

ó (1) teaspoons, tablespoons, or gallons; or

ó (2) milliliters, liters, cups, pints, or quarts.

9.5 Students will solve real-world problems including:

ó (1) weight problems with grams, kilograms, ounces, or pounds, using addition or subtraction with no conversion; and

ó (2) capacity problems with liters, cups, pints, or quarts, using addition or subtraction with no conversion.

9.6 Students will determine the temperature by:

ó (1) using Fahrenheit and Celsius thermometers; and

(2) applying the standard conversion formula from Fahrenheit scale to Celsius scale.

ó 9.7 Students will tell time in hours and minutes.

9.8 Students will compute time measures by:

(1) conversion between seconds, minutes, and hours;

(2) addition and subtraction of time measures; and

(3) use of a stopwatch.

9.9 Students will measure angles and draw angles with specified measure.

9.10 Students will find the perimeter of:

*(1) triangles;

*(2) quadrilaterals; and

(3) pentagons.

*9.11 Students will add or subtract two metric lengths with regrouping required.

#δ 9.12 Students will solve linear measurement problems with centimeters, meters, inches, feet, or yards using addition or subtraction; no conversion between English and metric system.

9.13 Students will compute payments on an installment plan.

9.14 Students will find the circumference of a circle.

9.15 Students will find the area of:

(1) rectangles;

(2) parallelograms;

(3) triangles;

(4) circles; and

(5) trapezoids.

9.16 Students will find the surface area of rectangular prisms.

δ 9.17 Students will identify the following solids:

(1) cubes,

(2) cones;

(3) cylinders, and

(4) spheres.

9.18 Students will find the volume of:

- # (1) rectangular prisms; and
- (2) cylinders.

9.19 Students will solve real-world measurement problems.

10.0 Integers

# 10.1 Students will locate integers on a number line.

10.2 Students will compare integers using > , < , and = .

10.3 Students will state the absolute value and opposite of given integers.

# 10.4 Students will add:

- (1) integers using a number line;
- (2) integers using the rules for addition;
- *(3) integers less than 100; and
- (4) integers greater than 100.

10.5 Students will subtract:

- (1) integers using a number line;
- (2) integers using the definition of subtraction;
- *(3) integers less than 100; and
- (4) integers greater than 100.

# 10.6 Students will multiply:

- *(1) integers less than 100, and
- (2) integers greater than 100.

10.7 Students will divide:

- *(1) integers less than 100, and
- (2) integers greater than 100.

10.8 Students will graph ordered pairs on a coordinate plane.

10.9 Students will interpret stock tables.

11.0 Triangles

11.1 Students will find the square roots of numbers by the use of:

(1) a square root table; and/or

(2) approximation.

11.2 Students will solve problems involving:

(1) 30°- 60° right triangles;

(2) similar triangles; and

(3) the Pythagorean theorem.

12.0 Operations and Their Properties

12.1 Students will identify the following properties of addition:

(1) commutative property of addition;

(2) associative property of addition;

(3) additive identity property; and

(4) additive inverse property.

12.2 Students will identify the following properties of multiplication:

(1) commutative property of multiplication;

(2) associative property of multiplication;

(3) multiplicative identity property;

(4) multiplicative property of zero; and

(5) distributive property of multiplication over addition.

13.0 Equations and Inequalities

13.1 Students will simplify numerical expressions by using:

(1) grouping symbols; and

(2) the order of operations.

13.2 Students will define each of the following mathematical terms:

(1) variable;

(2) solution;

(3) open equation;

(4) replacement set; and

(5) solution set.

*13.3 Students will solve simple equations containing whole numbers and whole number solutions by using the:

(1) addition property of equality;

(2) multiplication property of equality; and

(3) both addition and multiplication properties of equality.

13.4 Students will solve simple inequalities.

13.5 Students will graph on a number line the solution set of simple equations and simple inequalities.

#δ*13.6 Students will translate and solve one-step whole number problems requiring one of the four operations.

13.7 Students will solve two-step whole number word problems requiring one of the four operations.

14.0 Sets

14.1 Students will identify sets as (1) empty; (2) finite; or (3) infinite.

14.2 Students will identify the subsets of a given set.

14.3 Students will draw Venn diagrams.

*14.4 Students will find the union of two sets by using:

(1) roster method;

(2) rule method; and

# (3) Venn diagrams.

*14.5 Students will find the intersection of two sets by using:

(1) roster method;

(2) rule method; and

(3) Venn diagrams.

15.0 Operations with Signed Numbers

15.1 Students will state the opposite of given rational numbers.

15.2 Students will state the reciprocal of given rational numbers.

15.3 Students will state the absolute value of given rational numbers.

# 15.4 Students will perform the fundamental operations on given pairs of signed rational numbers.

15.5 Students will square three-digit whole numbers.

15.6 Students will find the square roots of three-digit whole numbers by (1) reading a table or (2) estimating.

16.0 Equations and Inequalities

# 16.1 Students will simplify numerical expressions by using the order of operations including the use of parentheses, but excluding the use of exponents.

16.2 Students will define the term variable.

16.3 Students will translate:

(1) word phrases to mathematical expressions,

(2) mathematical expressions to word phrases, and

6 (3) word sentences to first-degree equations or inequalities in one variable.

16.4 Students will evaluate algebraic phrases involving one variable when given the replacement set for that variable.

16.5 Students will use set langauge including (1) replacement set, (2) solution set, and (3) empty set.

16.6 Students will solve first-degree equations in one variable.

16.7 Students will solve first-degree inequalities in one variable.

16.8 Students will solve ratio and proportion problems.

16.9 Students will graph on the number line the solution sets of (1) first-degree equations and (2) first-degree inequalities.

16.10 Students will solve verbal problems requiring one variable using (1) first-degree equations or (2) first degree inequalities.

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
1.0	WHOLE NUMBERS	2 Weeks									
1.1	Read/Write Whole Numbers		SSAP SAT	4	1,2		12			1-4	B-1,5
1.2	Add Whole Numbers		SSAP SAT	6,8-11	3,4	2	34-46	W+		10-19	F-13
1.3	Subtract Whole Numbers		SSAP SAT	6,12,14-15		3	34,37, 38	W-		20-29	G-14
1.4	Word Problems Whole Numbers		SSAP	16	11					10-40	T-40
1.5	Compare/Order (<,>,=)		SSAP	20-21	5						D-8
1.6	Round/ Estimate (Word Problems, +,-)		SSAP SAT	22-25			18-19, 76-77			5-8	C-6, S-38, S-39
1.7	Roman Numerals			27	6		20-21				

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
1.8	Write Expanded Notation		SAT	3,34-35			13,16,17				
1.9	Multiply Whole Numbers		MLST SSAP SAT	29-31, 36-37	7,8, 9	8,11	39-43	Wx		30-40	H-15
1.10	Divide Whole Numbers		MLST SSAP SAT	38-39,46, 48-51		14, 17	39,44, 46-49	W÷		41-59, 61	I-16, I-17
1.11	Estimate (x,÷)		SAT	44-45			50-51				
1.12	Word Problems (x,÷)		SSAP	40-41			112,118, 134,151			30-61	T-41
2.0	DECIMALS	3 Weeks									
2.1	Read/Write Decimals		SSAP	56-57	13		188-191	D1	D1	129-131	B-3
2.2	Round Decimals		MLST SSAP SAT	58-59	23		198-199	D5	D7	133-135, 147-149	C-7

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
				County Adopted Merrill			Supplementary Instructional Materials				
Number	Topic	Teaching Time	Tested On	Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
2.3	Compare Decimals (<,>,=)		60-65	60-61	14		196-197		D2	131-133	
2.4	Add Decimals		MLST SSAP	62-63		22	202	D6,8	D3	139-140	L-21
2.5	Subtract Decimals		MLST SSAP	64-65		24	203	D7,9	D4	141-142	L-22
2.6	Read/Write Money Values		SSAP			23					B-4, Q-36
2.7	Money (+,-), (Word Problems), (Equivalent Amounts)		SSAP SAT	66-67,70	16, 17	23, 24				15	V-44, V-45
2.8	Estimate Sum/ Difference			72-73	15						
2.9	Identify Metric Prefixes			74-75							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
2.10	Convert Within Metric			76-77							
2.11	Multiply Decimals		MLST SSAP SAT	81-87	20	28	204-205	D10	D5,6	143-146, 149-152	M-23, M-24
2.12	Divide Decimals		MLST SSAP SAT	88-90, 98-101	22, 24	31	208-210	D11	D8-10	153-170	M-25
2.13	Find Unit Price		SSAP	91						297-298	V-45
2.14	Multiply/ Divide Decimals			93,96-97		28	211	D10,11	D5-10		
2.15	Change % to Decimal		SSAP	102-103	51		220-221	P7	P3	174-175	E-11
2.16	Change Decimal to %			102-103	51			P5	P4	174-175	E-12

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
2.17	Find % of Number		MLST SAT	104-105		74	222-223	P8			
2.18	Estimate Product/ Quotient		SAT	106-107							
2.19	Write Scientific Notation			109	25		13,206-207				
2.20	Write Standard Notation			109			13-15				
3.0	GEOMETRY	1 Week									
3.1	Identify: Point, Line, Segment		SAT	111-112, 124		27, 32	86-89, 268, 270-271				P-33
3.2	Identify: Rays, Angles, Planes		SSAP SAT	114-115		32	86-89, 266-268, 270-271				P-33, P-35

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
				County Adopted Merrill			Supplementary Instructional Materials				
Number	Topic	Teaching Time	Tested On	Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
3.3	Classify Angles		MLST	120-121, 128-131			90, 92-93, 98-101, 106-109				
3.4	Construct: Line Segment, Angles, Parallel Lines, Perpendicular Rays			113,115	29		96-97, 276-277				
3.5	Bisect: Line Segment, Angles			116-117	27, 30		94-95				
3.6	Identify: Name 3-8 Sided Figures		SSAP SAT	118, 126-127, 132-133	90		104-105, 110-111				P-34
4.0	FACTORS/ MULTIPLES	1 Week									

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
4.1	Find Factors: Divisibility 2,3,5,9,10			137-141			116-117, 120-125				
4.2	Use Sales Tax Tables			142		35				292-294	
4.3	Identify Prime/ Composite		SAT	143	33	34	126-127	FBS11			
4.4	Compute Prime Factorization		SAT	144-145	34		128-129				
4.5	Find Greatest Common Factor		SAT	148-149	35	34	130-131	FBS12			
4.6	Find Least Common Multiple		SAT	150-153	36	37	132-133	FBS10			
5.0	FRACTIONS	5 Weeks									
5.1	Read/Write Fractions		SSAP SAT	157			138-139		F1	66-68	B-2

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KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
5.2	Identify Equivalent Fractions		SSAP SAT	158-159		34	140-143		F2	75-77	E-9
5.3	Reduce to Lowest Terms		MLST SAT	160-161	39	34	144-145	FBS13	F2	70-74	
5.4	Use Insulation Tables			162		43					
5.5	Change Improper Fraction to Mixed Number		SSAP	163		37	152-153	FBS15	F3	80-82	
5.6	Add/Subtract Like Denominators			164-167				F+1,2 F-1,2	F4	85-87	J-18
5.7	Find Extraneous Information		SSAP SAT	170-171			75				R-37
5.8	Compare (<,>,=)			172-173	41		148-150			68-69, 77-79	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
5.9	Add Fractions		MLST SSAP SAT	174-177	42, 43	42	162-165	F+ 3,4,5	F5	88-94	J-18
5.10	Subtract Fractions		MLST SSAP SAT	178-181	43	45	166-167	F- 3,4, 5,6	F6	94-100	J-19
5.11	Add Using Rulers			183	44						
5.12	Change Mixed Numbers to Improper Fractions			189		37	152-153	FBS15	F3	80-82	C-10
5.13	Multiply Fractions (Word Problems)		MLST SSAP SAT	185-188, 190-191	45	48	168-170, 185	Fx 1,2,3, 4,5	F7,8	62-65, 103-112	K-20, U-43
5.14	State Reciprocal			192-193			175-177				

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
5.15	Divide Fractions		MLST	194-195, 198-199	46, 50	51	178-179	F÷ 1,2,3, 4,5,6	F9, 10	113-118, 135-137	
5.16	Change Fractions to Terminating Decimals		MLST SSAP	200-201	47	56, 59	193-194	D,2,3,4	D10		
5.17	Change Fractions to Non-Repeating Decimals			200-201	47	56, 59	195	D,2,3,4	D10		
5.18	Change Fractions to %		MLST SSAP	202-203	48, 51, 68	56, 59	214-219	P3,4	P5	176-178	
5.19	Change % to Fractions			204-205	51, 68	59	220-221	P6	P2	176-178	E-12
5.20	Determine Insufficient Information		SSAP SAT	206-207			74				R-37

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KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
				County Adopted Merrill			Supplementary Instructional Materials				
Number	Topic	Teaching Time	Tested On	Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
6.0	PROBABILITY	2 Weeks									
6.1	Find Outcome of Event			211		57	72-73, 358-359,				
6.2	Compare Actual/ Expected Probabilities			212-213	52, 54	57	360, 362-367				
6.3	Determine Probability of Outcome		SAT	214-219, 222-223	52, 53, 56, 57		368-369				
6.4	Change Probability to %			224-225	55						
6.5	Change % to Probability			224-227	55						
6.6	Determine Odds			228-229							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
				County Adopted Merrill			Supplementary Instructional Materials				
Number	Topic	Teaching Time	Tested On	Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
6.7	Compute Probability (Word Problems)			230-231							
7.0	STATISTICS/ GRAPHING	1 Week									
7.1	Compute: Mode, Mean, Median		SAT	235-239	59		370-371				
7.2	Interpret Graphs		MLST SSAP SAT	240-243, 246-249	60, 63		81, 372-380			315-323	X-49
7.3	Construct Circle Graphs			250							
7.4	Locate Points on Map		SSAP	252-253	61						X-50
7.5	Graphing 1st Quadrant			254-255	62						

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
				County Adopted Merrill			Supplementary Instructional Materials				
Number	Topic	Teaching Time	Tested On	Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
7.6	Compute Averages, Frequency Tables			257	58					59-60	
8.0	RATIO/ PROPORTION/ PERCENT	7 Weeks									
8.1	Express Ratio as Fraction			259		62	154-155, 214-215, 220	FBS 5,6	P1	123-127, 171-173	
8.2	Compute Rate		SAT	260			157				
8.3	Find Cross-Products			262-263	64, 65	67	146				
8.4	Find Missing Term			264-265						118-123	
8.5	Compare Fractions			266-267, 283	66		146				

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
8.6	Determine Solutions, Scale Drawings		SAT	268-269			280-281			323-326	
8.7	a% of b = c, Find a,b, or c		SAT	272-273		79, 86, 91	224-229	P9,10	P6-10	181-188	
8.8	Solve Word Problems (Tax Rates, Discount, Simple Interest)			274-281	49, 67, 70	80, 87	230-236		P6-10	188-190, 299-301, 303-308	
9.0	MEASUREMENT	4 Weeks									
9.1	Measurement Non-Standard Units			285						223-225	
9.2	Determine Length/Width/Height		SSAP	286-287	71, 81		242-243			193-196	W-46

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
9.3	Determine Weight (g,oz,kg,lb)		SSAP	292-293	81		258, 260-261			219-221	0-30, 0-31, W-48
9.4	Determine Capacity (tsp,Tbsp,pt, qt,gal,mL, L,c)		SSAP	294-295	81		256-257			217-219	0-28, 0-29, W-47
9.5	Determine Weight/ Capacity (Word Problems)		SSAP								W-47
9.6	Determine Temperature Fahrenheit/ Celsius		SSAP	298-299		75	262-263				0-32
9.7	Tell Time		SSAP	301	73					221-223	0-26
9.8	Compute/ Convert Time		SAT	302-303, 309	76					226-228	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
				County Adopted Merrill			Supplementary Instructional Materials				
Number	Topic	Teaching Time	Tested On	Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
9.9	Measure/Draw Angles			304-305	74						
9.10	Compute Perimeter: Triangle, Quadrilateral, Pentagon		MLST SAT	311-312	75, 77, 83		284			197-200	
9.11	Add/Subtract Metric Length		MLST	302-303			244-245, 250-251				
9.12	Solve Linear Measurement (Word Problems)		SSAP SAT	306-307						239	
9.13	Compute Payments			313							
9.14	Compute Circumference			314-315			290-291				

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KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
				County Adopted Merrill			Supplementary Instructional Materials				
Number	Topic	Teaching Time	Tested On	Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
9.15	Compute Area		SAT	316-319, 322-325	78, 79, 82		285-287, 292-293			201-207	
9.16	Compute Surface Area (Rectangular Prisms)			326-327			298-299				
9.17	Identify Cubes/Cones/ Cylinders/ Spheres		SSAP								P-34
9.18	Compute Volume Rectangular Prisms/ Cylinders		SAT	328-331	80		294-296			208-213	
9.19	Solve Measurement (Word Problems)			332-333			254,259			239	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
10.0	INTEGERS	2 Weeks									
10.1	Locate Number on Number Line		SAT	337			304-305				
10.2	Compare Integers (<,>,=)			337			304-305				
10.3	Identify Absolute Value/ Opposites			338-339			318-319				
10.4	Add Integers		MLST SAT	340-343	84		306-307, 310-313				
10.5	Subtract Integers		MLST	344-345	85		316-317				
10.6	Multiply Integers		MLST SAT	348-349	86		312-327				
10.7	Divide Integers		MLST	350-351	86, 87		330-331				

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
10.8	Graph Ordered Pairs			353-355	88		340-343				
10.9	Interpret Stock Tables			352							
11.0	TRIANGLES	1 Week									
11.1	Use Tables: Square Root, Approximation			370-373	91, 92, 96						
11.2	Identify Triangles: Right, Similar			361-367, 370-375, 378-381	93, 94		282-283				
12.0	OPERATIONS/ PROPERTIES	½ Week									
12.1	Identify Properties of Addition		SAT	7,359	10		171,314				

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
				County Adopted Merrill			Supplementary Instructional Materials				
Number	Topic	Teaching Time	Tested On	Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
12.2	Identify Properties of Multiplication		SAT	35,79,359	10, 18		171-173, 328-329				
13.0	EQUATIONS/ INEQUALITIES	4 Weeks									
13.1	Simplify Expressions				12		53			329-332	
13.2	Define Set Notation						53			332-333	
13.3	Solve Simple Equations (+,x)		MLST				54-55			335-346	
13.4	Solve Simple Equations (+,-,x,÷)		SAT		89		54-55			335-346	
13.5	Graph Solution Sets		SAT				58				

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
				County Adopted Merrill			Supplementary Instructional Materials				
Number	Topic	Teaching Time	Tested On	Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
13.6	Translate/ Solve One-Step Word Problems		MLST SSAP SAT				62-65			335-346	T-42
13.7	Translate/ Solve Two-Step Word Problems		SAT				79			346-350	
14.0	SETS	½ Week									
14.1	Identify Sets Empty/Finite/ Infinite						vi,1,11				
14.2	Identify Subsets		SAT				2				
14.3	Construct Venn Diagrams						4-5				
14.4	Identify Set Union		MLST SAT				8				

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
14.5	Identify Set Intersection		MLST				9				
15.0	OPERATIONS WITH SIGNED NUMBERS	2 Weeks									
15.1	State Opposites			*38-40							
15.2	State Reciprocal			*70-72							
15.3	State Absolute Value			*38-40							
15.4	Perform Fundamental Operations									181-183, 185-186, 189-190, 192-193	

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*Algebra I - adopted text

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
15.5	Square Whole Numbers						13-15				
15.6	Find Square Roots			*487							
16.0	EQUATIONS/ INEQUALITIES	2 Weeks									
16.1	Simplify Numerical Expression			*1-6						6-7	
16.2	Define Variable						53				
16.3	Translate Phrases and Sentences						62-67				T-42
16.4	Evaluate Phrases			*1-6							
16.5	Use Set Language						56			263, 294	

*Algebra I - adopted text

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, ADVANCED

Performance Objective		Instructional Implications		Resources							
Number	Topic	Teaching Time	Tested On	County Adopted Merrill			Supplementary Instructional Materials				
				Text	E&R	E&A	Holt	ICSP	CSM	AMSCO	SSAP Manual
16.6	Solve 1st-Degree Equations, 1 Variable						54-55, 64-71			17-27, 224-229, 233-234	
16.7	Solve 1st-Degree Inequalities, 1 Variable						56-57			266-268	
16.8	Solve Ratio/ Proportion Problems						214-219			107, 109-111, 113-115	
16.9	Graph On Number Line						58			267	
16.10	Solve Verbal Problems						64-73,79			34-43, 268-269	

INTRODUCTION
MATHEMATICS 7, STANDARD

State Accreditator Number. .	2211
Course Code Number	1403
F.T.E. Category.	1.00
Instructional Level.	Standard

Report Card Abbreviation . .	MATH 7
Length of Course	Year
Credit	1 Math Credit
Grade Level.	7

Prerequisites

Teacher Recommendation

Textbook(s)

Vanatta, Glen, et al, Mathematics: Essentials and Applications (Columbus, Ohio: Charles E. Merrill Publishing Co., 1980).

Notes to Teachers

Students will master the concepts and skills developed for Mathematics 7, Standard as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

State Assessment objectives are indicated by the symbol o̍.
Stanford Achievement objectives are indicated by the symbol #.

MATHEMATICS 7, STANDARD

- 1.0 Whole Numbers
  - # 1.1 Read/Write
    - δ 1.1.1 3-digit numbers
    - δ 1.1.2 Between 10,000/ 10,000,000
  - 1.2 Add
    - # *1.2.1 Three 3-digit addends
    - #δ 1.2.2 Three 4-digit addends
  - # 1.3 Subtract
    - *1.3.1 3-digit numbers
    - δ 1.3.2 5-digit numbers
    - 1.3.3 Consumer skill: meter reading
  - 1.4 Solve Real-World Problems
    - *1.4.1 Addition of two 3-digit numbers
    - *1.4.2 Subtraction of 3-digit numbers
    - δ 1.4.3 Addition/ Subtraction of 4-digit numbers
    - #δ 1.4.4 Translation to number sentences
  - 1.5 Compare/Order
    - δ 1.5.1 Numbers less than 10,000
    - 1.5.2 Numbers having at least 5-digits
  - 1.6 Round
    - # *1.6.1 Numbers less than 1,000
    - #δ 1.6.2 Numbers less than 10,000
    - δ 1.6.3 Estimation of real-world addition problems
    - δ 1.6.4 Estimation of real-world subtraction problems
  - 1.7 Read Roman Numerals
  - # 1.8 Write Expanded Notation
  - 1.9 Multiply
    - # *1.9.1 2-digit numbers
    - #δ 1.9.2 2-digit numbers/ 3-digit numbers
  - 1.10 Divide
    - #δ*1.10.1 5-digit by 1-digit number
    - #δ*1.10.2 3-digit by 2-digit multiples of ten
    - # 1.10.3 3-digit by 2-digit
  - # 1.11 Estimate Product/Quotient
  - 1.12 Solve Real-World Problems
    - *1.12.1 Multiplication of 2-digit numbers
    - δ 1.12.2 Multiplication of 2-digit/3-digit numbers
    - 1.12.3 Division

- 2.0 Decimals
  - 2.1 Read/Write
    - δ 2.1.1 Decimal fractions through hundredths
    - 2.1.2 Decimal fractions between hundredths/ thousandths
  - 2.2 Round
    - #δ 2.2.1 Decimal fractions less than ten to nearest whole number
    - 2.2.2 Decimal fractions to any designated place
  - 2.3 Compare
  - 2.4 Add
    - *2.4.1 3 decimal fractions: no more than one decimal place

* Indicates Minimum Level Skills
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

MATHEMATICS 7, STANDARD

- δ 2.4.2 3 decimal fractions: no more than two decimal places
- 2.4.3 3 decimal fractions: no more than three decimal places
- 2.5 Subtract
  - *2.5.1 Decimal fractions: no more than one decimal place
  - δ 2.5.2 Decimal fractions: no more than two decimal places
  - 2.5.3 Decimal fractions: no more than three decimal places
- δ 2.6 Read/Write Money Values
- 2.7 Solve Money Problems
  - 2.7.1 Addition/Subtraction
  - #δ 2.7.2 Real-world purchase problems
  - δ 2.7.3 Equivalent amounts
- 2.8 Estimate Sum/Difference
- 2.9 Identify Metric Prefixes
- 2.10 Convert within Metric System
- 2.11 Multiply
  - #δ 2.11.1 Whole/Decimal fraction: no more than two decimal places
  - δ*2.11.2 Decimal fractions named in tenths
  - δ 2.11.3 Decimal fractions named in hundredths
  - # 2.11.4 Decimal fractions
- 2.12 Divide
  - 2.12.1 Decimal fraction by 1-digit or 2-digit whole number
  - δ 2.12.2 Decimal fraction by 2-digit multiple of ten
  - # 2.12.3 Decimal fraction by any whole number or decimal fraction
- δ 2.13 Solve Real-World Comparison Problems
- 2.14 Multiply/Divide Decimal Fractions by 10, 100, 1000
- δ 2.15 Change Percent to Decimal Fraction
- 2.16 Change Decimal Fraction to Percent
- # 2.17 Find Percent of Number
- # 2.18 Estimate Product/Quotient
- 2.19 Write Numbers in Scientific Notation
- 2.20 Change Scientific Notation to Standard Form

3.0 Geometry

- 3.1 Identify
  - 3.1.1 Points
  - # 3.1.2 Line segments
  - 3.1.3 Lines
  - 3.1.4 Perpendicular lines
  - 3.1.5 Parallel lines
- 3.2 Identify
  - 3.2.1 Rays
  - #δ 3.2.2 Angles
  - 3.2.3 Planes
- 3.3 Define Angle Types/Relationships
  - 3.3.1 Acute/Right/Obtuse
  - 3.3.2 Complementary/Supplementary/Vertical
- 3.4 Construct
  - 3.4.1 Congruent line segments
  - 3.4.2 Congruent angles

MATHEMATICS 7, STANDARD

- 3.4.3 Parallel lines
- 3.4.4 Perpendicular rays
- 3.5 Bisect Line Segments/ Angles
- #δ 3.6 Identify/Name Polygons
  - 3.6.1 Triangles
  - 3.6.2 Quadrilaterals
  - 3.6.3 5-8 sided figures

4.0 Factors/Multiples

- 4.1 Find Factors
  - 4.1.1 Numbers divisible by two
  - 4.1.2 Numbers divisible by five
  - 4.1.3 Numbers divisible by ten
  - 4.1.4 Numbers divisible by three
  - 4.1.5 Numbers divisible by nine
- 4.2 Use Sales Tax Table
- 4.3 Classify Whole Numbers
  - # 4.3.1 Prime
  - 4.3.2 Composite
- # 4.4 Find Prime Factorization
- # 4.5 Compute Greatest Common Factor
- # 4.6 Compute Least Common Multiple

5.0 Fractions

- #δ 5.1 Read/Write Fractions
- #δ 5.2 Identify Equivalent Fractions
- # *5.3 Reduce Fractions to Simplest Form
- 5.4 Use Insulation Table
- δ 5.5 Identify Improper Fractions as Mixed Numbers
- 5.6 Add/Subtract with Like Denominators
- #δ 5.7 Determine Extraneous Information in Real-World Problems
- # 5.8 Compare
- 5.9 Add
  - *5.9.1 Proper fractions: common denominator in problem
  - δ 5.9.2 Proper fractions
  - # 5.9.3 Mixed numbers
- # 5.10 Subtract
  - *5.10.1 Proper fractions
  - δ 5.10.2 Proper fractions with denominators of 2,3,4,5,6,8, or 10
  - 5.10.3 Mixed numbers
- 5.11 Add with Aid of Rulers
- *5.12 Change Mixed Numbers to Improper Fractions
- 5.13 Multiply
  - #δ*5.13.1 Two proper fractions
  - 5.13.2 More than two proper fractions
  - δ 5.13.3 Real-world problems
  - # 5.13.4 Proper fractions/ Whole numbers
  - δ 5.13.5 Two improper fractions
  - 5.13.6 Mixed numbers
- 5.14 State Reciprocal
- 5.15 Divide
  - 5.15.1 Proper fractions
  - 5.15.2 Mixed numbers by whole numbers
- 5.16 Identify Fractions as Repeating/Terminating Decimals
- δ 5.17 Change Fractions to Decimal Fractions/ Percents

MATHEMATICS 7, STANDARD

- 5.18 Change Percents to Fractions
- #δ 5.19 Determine Insufficient Information in Real-World Problems

6.0 Probability

- 6.1 Determine Number of Outcomes of an Event
- 6.2 Compare Actual/Expected Probabilities
- # 6.3 Determine Probability of an Outcome
  - 6.3.1 Tree diagrams
  - 6.3.2 Two dice
  - 6.3.3 Multiplication rule
- 6.4 Change Probability to Percent
- 6.5 Change Percent to Probability
- 6.6 Determine Odds
- 6.7 Solve Real-World Problems

7.0 Statistics/Graphing

- 7.1 Determine Measures of Central Tendency
  - 7.1.1 Mode
  - # 7.1.2 Mean
  - 7.1.3 Median
- 7.2 Interpret Information on Graphs
  - δ 7.2.1 Pictographs
  - δ 7.2.2 Bar graphs
  - # 7.2.3 Line graphs
  - 7.2.4 Circle graphs
- δ 7.3 Locate Points on Map
- 7.4 Graph in 1st Quadrant
- 7.5 Compute Averages Using Frequency Tables

8.0 Ratio/Proportion/Percent

- 8.1 Write a Ratio as a Fraction
- # 8.2 Compute Rate
- 8.3 Find Cross-Product
- 8.4 Find Missing Term
- 8.5 Compare Fractions Using Cross-Products
- # 8.6 Determine Solutions from Scale Drawings
- # 8.7 Solve Percent Problems
- 8.8 Solve Real-World Problems
  - 8.8.1 Tax rate
  - 8.8.2 Discount
  - 8.8.3 Simple interest

9.0 Measurement

- 9.1 Explore Nonstandard Units of Measure
- δ 9.2 Determine Length/Width/Height
- 9.3 Determine Weight
  - δ 9.3.1 Nearest gram or ounce
  - δ 9.3.2 Nearest kilogram or pound
- 9.4 Determine Capacity
  - δ 9.4.1 Teaspoons/Tablespoons/Gallons
  - δ 9.4.2 Milliliters/Liters/Cups/Pints/Quarts
- 9.5 Solve Real-World Problems
  - δ 9.5.1 Weight
  - δ 9.5.2 Capacity
- 9.6 Determine Temperature
  - δ 9.6.1 Fahrenheit/Celsius
  - 9.6.2 Conversion of temperature readings

MATHEMATICS 7, STANDARD

- ó 9.7 Tell Time
- 9.8 Compute Time Measure
  - 9.8.1 Conversion
  - 9.8.2 Addition/Subtraction
  - # 9.8.3 Stopwatch
- 9.9 Measure/Draw Angles
- 9.10 Find Perimeter
  - 9.10.1 Triangles
  - # 9.10.2 Quadrilaterals
  - 9.10.3 Pentagons
- #ó*9.11 Solve Linear Measurement Problems
- 9.12 Compute Payments on Installment Plan
- 9.13 Find Circumference
- 9.14 Find Area
  - # 9.14.1 Rectangles
  - 9.14.2 Parallelograms
  - 9.14.3 Triangles
  - 9.14.4 Circles
  - 9.14.5 Trapezoids
- ó 9.15 Identify Solids
  - 9.15.1 Cubes
  - 9.15.2 Cones
  - 9.15.3 Cylinders
  - 9.15.4 Spheres
- 9.16 Find Volume
  - # 9.16.1 Rectangular prisms
  - 9.16.2 Cylinders
- 9.17 Solve Real-World Measurement Problems

10.0 Integers

- # 10.1 Locate Integers on Number Line
- 10.2 Compare
- 10.3 State Absolute Value
- # 10.4 Add
- 10.5 Subtract
- # 10.6 Multiply
- # 10.7 Divide
- 10.8 Interpret Stock Tables
- # 10.9 Graph Ordered Pairs
- # 10.10 Name Properties

11.0 Triangle

- 11.1 Identify Properties of Equilateral Triangles
- 11.2 Solve Problems Involving 30^0 - 60^0 Right Triangles
- 11.3 Solve Problems Involving Similar Triangles
- 11.4 Find Square roots
  - 11.4.1 Square root tables
  - 11.4.2 Approximations
- 11.5 Solve Problems Applying Pythagorean Theorem

PERFORMANCE OBJECTIVES
MATHEMATICS 7, STANDARD

Mathematics 7 is designed to continue the mathematical development of students who have mastered the skills of elementary school arithmetic. The units range from a review of the fundamental operations with whole numbers to solving problems by applying the Pythagorean theorem. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Whole Numbers

1.1 Students will read and write:

  δ (1) word names for three-digit whole numbers; and

  δ (2) the numeral representing any whole number from ten thousand to less than ten million.

1.2 Students will add:

  # *(1) any three three-digit whole numbers; and

  #δ (2) any three four-digit numbers.

# 1.3 Students will subtract:

  *(1) three-digit whole numbers;

  δ (2) any two five-digit numbers; and

  (3) meter readings to determine the number of kilowatt hours used.

1.4 Students will solve real-world problems involving:

  *(1) addition of two three-digit whole numbers;

  *(2) subtraction of three-digit whole numbers;

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* Indicates Minimum Level Skills
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

δ (3) addition or subtraction of four-digit numbers; and

#δ (4) translation of a one-step problem into the appropriate number sentence.

1.5 Students will compare and order:

δ (1) any three whole numbers less than 10,000; and

(2) whole numbers having at least five-digits.

1.6 Students will round:

# *(1) a whole number less than 1,000 to any designated place;

#δ (2) a whole number less than 10,000 to any designated place;

δ (3) to the nearest ten, hundred, or thousand when estimating the solution to a real-world addition problem involving up to four-digit numbers; and

δ (4) to the nearest ten, hundred, or thousand when estimating the solution to a real-world subtraction problem involving up to four-digit numbers.

1.7 Students will read Roman numerals no greater than two thousand.

1.8 Students will write in expanded notation numbers written in standard form and reverse.

1.9 Students will multiply:

# *(1) a two-digit whole number by a two-digit whole number; and

#δ (2) a two-digit number and a three-digit number.

1.10 Students will divide:

#δ*(1) up to and including a five-digit whole number by a one-digit whole number, with remainder;

#δ*(2) a three-digit whole number by a multiple of ten less than 100, no remainder; and

# (3) a three-digit whole number by a two-digit whole number.

1.11 Students will estimate the product or quotient of two whole numbers.

1.12 Students will solve real-world problems involving:

*(1) multiplication of two two-digit whole numbers;

δ (2) multiplication of a two-digit number and a three-digit number; and

(3) division of whole numbers.

2.0 Decimals

2.1 Students will read and write:

δ (1) a mixed decimal fraction through hundredths; and

(2) decimal fractions between hundredths and thousandths.

2.2 Students will round:

#δ (1) a decimal fraction less than 10, with no more than two decimal places, to the nearest whole number, and

(2) decimal fractions to any designated place.

2.3 Students will compare decimals using < , > , or =.

2.4 Students will add:

*(1) three decimal fractions with no more than one decimal place in each, regrouping required;

δ (2) three decimal fractions, each having no more than two decimal places; and

(3) three decimal fractions, each having no more than three decimal places.

2.5 Students will subtract:

*(1) decimal fractions with no more than one decimal place in each, regrouping required;

δ (2) two decimal fractions, each having no more than two decimal places; and

(3) decimal fractions with no more than three decimal places.

δ 2.6 Students will read and write money values through $1,000.

2.7 Students will solve money problems by determining:

(1) the sum and difference of given amounts of money;

#δ (2) the solution to real-world problems involving purchases totaling less than ten dollars with change from a twenty dollar bill; and

δ (3) equivalent amounts of up to twenty dollars using coins and paper currency.

2.8 Students will estimate the sum and difference of decimal fractions.

2.9 Students will identify metric prefixes.

2.10 Students will convert within the metric system.

2.11 Students will multiply:

#δ (1) a whole number and a decimal fraction having no more than two decimal places;

δ*(2) two decimal fractions named in tenths;

δ (3) two decimal fractions named in hundredths; and

(4) any decimal fraction by any whole number or decimal fraction.

2.12 Students will divide:

(1) a decimal fraction by a one-digit or two-digit whole number where the quotient is a decimal;

δ (2) a decimal fraction named in tenths or hundredths by multiples of 10 less than 100; and

(3) a decimal fraction by any whole number or decimal fraction.

δ 2.13 Students will solve real-world problems involving comparison shopping for purchases less than ten dollars.

2.14 Students will multiply or divide decimal fractions by 10, 100, and 1,000.

δ 2.15 Students will change a whole number percent less than 100% to equivalent decimal form.

2.16 Students will change a decimal fraction named in tenths or hundredths to an equivalent percent.

# 2.17 Students will find a percent of a number.

# 2.18 Students will estimate products and quotients of decimals.

2.19 Students will write numbers in scientific notation.

2.20 Students will change numbers in scientific notation to standard form.

3.0 Geometry

3.1 Students will identify:

(1) points;

# (2) line segments;

(3) lines;

(4) perpendicular lines; and

(5) parallel lines.

3.2 Students will identify:

(1) rays;

#6 (2) angles; and

(3) planes.

3.3 Students will define angle types and relationships as:

(1) acute, right, or obtuse; and

(2) complementary, supplementary, or vertical.

3.4 Students will construct:

(1) congruent line segments;

(2) congruent angles;

(3) parallel lines; and

(4) perpendicular rays.

3.5 Students will bisect line segments and angles.

#ȯ 3.6 Students will identify and name polygons with emphasis on:

- (1) triangles;
- (2) quadrilaterals; and
- (3) five through eight sided figures, inclusive.

4.0 Factors and Multiples

4.1 Students will find factors of numbers divisible by (1) two, (2) five, (3) ten, (4) three, and (5) nine.

4.2 Students will use a sales tax table to determine the total price of purchases.

4.3 Students will classify whole numbers as:

- # (1) prime, or
- (2) composite.

# 4.4 Students will find the prime factorization of composite numbers.

# 4.5 Students will compute the greatest common factor of two numbers.

# 4.6 Students will compute the least common multiple of two or three numbers.

5.0 Fractions

#ȯ 5.1 Students will read and write fractions having denominators of 2, 3, 4, 5, 6, 8, 10, 20, 25, 50, or 100.

#ȯ 5.2 Students will identify a fraction that is equivalent to a given proper fraction having a denominator of 2, 3, 4, 5, 6, 8, 10, 20, 25, 50, or 100.

# *5.3 Students will reduce a common fraction to simplest form.

5.4 Students will use an insulation table to arithmetically compare resistances of various insulators (consumer skill).

δ 5.5 Students will identify an improper fraction that is equivalent to a mixed number component less than ten with a fractional component stated in halves, thirds, fourths, fifths, or tenths.

5.6 Students will add and subtract fractions having like denominators.

#δ 5.7 Students will determine whether extraneous information is given in solving a real-world problem having one step.

#5.8 Students will compare fractions using < , > , or =.

5.9 Students will add:

*(1) two proper fractions with unlike denominators of 2, 3, 4, 5, 7, 8, 10, or 16 with common denominator in the problem;

δ (2) two proper fractions having unlike denominators of 2, 3, 4, 5, 6, 8, or 10; and

#(3) mixed numbers.

#5.10 Students will subtract:

*(1) proper fractions having unlike denominators in problem;

δ (2) two proper fractions having unlike denominators of 2, 3, 4, 5, 6, 8, or 10; and

(3) mixed numbers.

5.11 Students will add mixed numbers with the aid of rulers.

*5.12 Students will change mixed numbers to improper fractions.

5.13 Students will multiply:

#δ*(1) any two proper fractions;

(2) more than two proper fractions;

δ (3) proper fractions to determine solution to real-world problems;

#(4) proper fractions and whole numbers;

δ (5) any two improper fractions; and

(6) mixed numbers.

5.14 Students will state the reciprocal of a given fraction.

5.15 Students will divide:

(1) a proper fraction by a proper fraction; and

(2) a mixed number by a whole number.

5.16 Students will identify fractions as repeating or terminating decimals.

δ 5.17 Students will change a proper fraction having a denominator of 10 or 100 to an equivalent decimal or percent.

5.18 Students will change percents to fractions.

#δ 5.19 Students will determine whether insufficient information is given in solving a real-world problem having one step.

6.0 Probability

6.1 Students will determine the number of specific outcomes of an event.

6.2 Students will compare actual and expected probabilities of outcomes.

# 6.3 Students will determine the probability of outcomes of events by:

(1) making tree diagrams;

(2) rolling two dice; and

(3) using the multiplication rule.

6.4 Students will change a probability to a percent.

6.5 Students will change a percent to a probability.

6.6 Students will determine the odds for an event.

6.7 Students will solve real-world problems using estimation to check for reasonableness.

7.0 Statistics and Graphing

7.1 Students will determine measures of central tendency of data by finding the:

(1) mode;

(2) mean; and

(3) median.

7.2 Students will interpret information illustrated by:

o̍ (1) pictographs;

o̍ (2) bar graphs;

(3) line graphs; and

(4) circle graphs.

o̍ 7.3 Students will locate a point on a highway map.

7.4 Students will graph in first quadrant using ordered pairs.

7.5 Students will compute averages using frequency tables.

8.0 Ratio, Proportion, and Percent

8.1 Students will write a ratio as a fraction in simplest form.

8.2 Students will compute rate.

8.3 Students will find the value of cross-products.

8.4 Students will find missing terms when given proportions having one unknown term.

8.5 Students will compare fractions by using cross-products.

8.6 Students will determine solutions to problems relating to scale drawings.

8.7 Students will solve percent problems.

8.8 Students will solve real-world problems involving (1) sales tax; (2) discount; and (3) simple interest.

9.0 Measurement

9.1 Students will explore nonstandard units of measure.

ȯ 9.2 Students will determine length, width, or height by measuring objects to nearest centimeter or meter, or 1/4 inch, 1/2 foot, or yard.

9.3 Students will determine weight by measuring to:

ȯ (1) nearest gram or ounce; or

ȯ (2) nearest kilogram or pound.

9.4 Students will determine capacity by measuring quantities in:

ȯ (1) teaspoons, tablespoons, or gallons; and

ȯ (2) milliliters, liters, cups, pints, or quarts.

9.5 Students will solve real-world problems including:

ȯ (1) weight problems with grams, kilograms, ounces, or pounds, using addition or subtraction with no conversion; and

ȯ (2) capacity problems with liters, cups, pints, or quarts, using addition or subtraction with no conversion.

9.6 Students will determine the temperature by:

ȯ (1) using Fahrenheit and Celsius thermometers; and

(2) applying the standard conversion formula from Fahrenheit scale to Celsius scale.

ȯ 9.7 Students will tell time in hours and minutes.

9.8 Students will compute time measure by:

(1) conversion between seconds, minutes, and hours;

(2) addition and subtraction of time measures; and

(3) use of a stopwatch.

9.9 Students will measure angles and draw angles with specified measure.

9.10 Students will find the perimeter of:

(1) triangles;

# (2) quadrilaterals; and

(3) pentagons.

#δ*9.11 Students will solve linear measurement problems with centimeters, meters, inches, feet, or yards using addition or subtraction; no conversion between English and metric system.

9.12 Students will compute payments on an installment plan.

9.13 Students will find the circumference of a circle.

9.14 Students will find the area of:

# (1) rectangles;

(2) parallelograms;

(3) triangles;

(4) circles; and

(5) trapezoids.

δ 9.15 Students will identify the following solids:

(1) cubes,

(2) cones,

(3) cylinders, and

(4) spheres.

9.16 Students will find the volume of:

# (1) rectangular prisms; and

(2) cylinders.

9.17 Students will solve real-world measurement problems.

10.0 Integers

#10.1 Students will locate integers on the number line.

10.2 Students will compare integers using < , > , and =.

10.3 Students will state the absolute value of given integers.

#10.4 Students will add two integers.

10.5 Students will subtract integers.

#10.6 Students will multiply two integers.

#10.7 Students will divide integers.

10.8 Students will interpret stock tables.

#10.9 Students will graph ordered pairs on a coordinate plane.

#10.10 Students will name properties of integers.

11.0 Triangles

11.1 Students will identify properties of equilateral triangles.

11.2 Students will solve problems involving 30°- 60° right triangles.

11.3 Students will solve problems involving similar triangles.

11.4 Students will find the square roots of numbers by the use of:

(1) a square root table; and/or

(2) approximation.

11.5 Students will solve problems by applying the Pythagorean theorem.

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 7, STANDARD

Performance Objective		Instructional Implications		Resources	
Number	Topic	Teaching Time	Tested on	County Adopted	Supplementary
	FOR TEACHING TIME SEE TEACHING GUIDE IN TEACHER'S EDITION, PP. T-12 THROUGH T-19. FOR SPECIFIC TESTS ON PERFORMANCE OBJECTIVES, SEE COURSE OUTLINE.			Glen Vanatta, et al, Mathematics: Essentials and Applications (Columbus, Ohio: Charles E. Merrill Publishing Co., 1980).	Eighth Grade Mathematics Teacher's Manual for Florida State Assessment Program (Duval County Public Schools, 1980). Glen Vanatta, et al, Mathematics: Essentials and Applications: Enrichment and Remediation Program (Columbus, Ohio: Charles E. Merrill Publishing Co., 1980). Glen Vanatta, et al, Mathematics: Essentials and Applications: Evaluation and Diagnostic Program (Columbus, Ohio: Charles E. Merrill Publishing Co., 1980). Glen Vanatta, et al, Mathematics: Essentials and Applications: Practice and Activities Workbook (Columbus, Ohio: Charles E. Merrill Publishing Co., 1980).

INTRODUCTION
MATHEMATICS 8, STANDARD

State Accreditator Number. . 2212
Course Code Number 1412
F.T.E. Category. 1.00
Instructional Level. . . . . Standard

Report Card Abbreviation . . MATH 8
Length of Course . . . . . . Year
Credit . . . . 1 Math Credit
Grade Level. 8

Prerequisites

Math Teacher Recommendation/Mastery of Mathematics 7

Textbook(s)

Vanatta, Glen, et al, *Mathematics: Essentials and Applications (Columbus, Ohio: Charles E. Merrill Publishing Co., 1980)*.

Notes to Teachers

Students will master the concepts and skills developed for Mathematics 8, Standard as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

State Assessment objectives are indicated by the symbol δ.
Stanford Achievement objectives are indicated by the symbol #.

COURSE OUTLINE

MATHEMATICS 8, STANDARD

- 1.0 Whole Numbers
  - 1.1 Round
    - δ*1.1.1 Numbers less than 10,000
    - 1.1.2 Numbers greater than 10,000
  - 1.2 Add
    - 1.2.1 Two 4-digit numbers
    - δ*1.2.2 Three 4-digit numbers
    - 1.2.3 Four 5-digit numbers
  - 1.3 Subtract
    - # 1.3.1 3-digit numbers
    - δ*1.3.2 5-digit numbers
    - # 1.3.3 6-digit numbers
  - δ*1.4 Solve Real-World Problems: Addition/Subtraction
  - # 1.5 Multiply
    - 1.5.1 2-digit numbers
    - δ*1.5.2 3-digit numbers by 2-digit numbers
    - 1.5.3 3-digit numbers
  - # 1.6 Identify/Use Properties: Addition/Multiplication
  - δ 1.7 Write Money Values: Consumer Skill
  - # 1.8 Divide
    - δ 1.8.1 1-digit divisor
    - δ*1.8.2 3-digit by 2-digit multiples of ten
    - 1.8.3 2-digit divisor
  - 1.9 Identify Base Ten Equivalency
  - # 1.10 Write Exponential Notation
  - # 1.11 Write Expanded Notation
  - 1.12 Solve Real-World Problems
    - δ*1.12.1 Multiplication
    - 1.12.2 Division

- 2.0 Decimals
  - 2.1 Write
    - # *2.1.1 Proper fractions: denominators of 10 or 100
    - 2.1.2 Proper fractions/Mixed numbers: denominators of 10, 100, or 1000
  - #δ 2.2 Round
  - 2.3 Compare
  - 2.4 Estimate Sum/Difference
  - 2.5 Use Grocery Receipt: Consumer Skill
  - 2.6 Add
    - δ*2.6.1 3 decimal fractions: no more than two decimal places
    - 2.6.2 4 decimal fractions: no more than three decimal places
  - 2.7 Subtract
    - δ*2.7.1 Decimal fractions: no more than two decimal places
    - 2.7.2 Decimal fractions: no more than three decimal places
  - 2.8 Identify Metric Prefixes
  - 2.9 Convert Within Metric System
  - 2.10 Compute Modular Arithmetic
  - # 2.11 Estimate Product/Quotient

* Indicates Minimum Level Skills
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

MATHEMATICS 8, STANDARD

- 2.12 Multiply
  - #δ 2.12.1 Whole number/Decimal fraction: no more than two decimal places
  - δ*2.12.2 Decimal fractions named in tenths/hundredths
  - # 2.12.3 Decimal fractions
- 2.13 Compute Weekly Wages: Consumer Skill
- 2.14 Divide
  - δ*2.14.1 Decimal fraction by 2-digit multiple of ten
  - 2.14.2 Decimal fraction/Whole number by a 1-digit or 2-digit number
  - # 2.14.3 Decimal fraction/Whole number by decimal fraction
- 2.15 Multiply/Divide Decimal Fractions by 10, 100, or 1000
- 2.16 Solve Real-World Problems
  - 2.16.1 Sports
  - #δ*2.16.2 Purchases
- # 2.17 Identify/Use Distributive Property

3.0 Fractions

- 3.1 Find Factors
  - 3.1.1 Numbers divisible by 2, 3, 5, 9, 10
  - 3.1.2 Any whole number
- 3.2 Classify Whole Numbers
  - 3.2.1 Prime
  - 3.2.2 Composite
- # 3.3 Find Prime Factorization
- # 3.4 Compute Greatest Common Factor
- δ*3.5 Read/Write Fractions
- 3.6 Simplify Fractions
- 3.7 Compute Least Common Multiple
- # 3.8 Compare
- #δ*3.9 Identify Equivalent Fractions
- 3.10 Add/Subtract: Like Denominators
- 3.11 Add
  - δ*3.11.1 Proper fractions: restricted denominators
  - 3.11.2 Proper fractions
  - # 3.11.3 Mixed numbers
- # 3.12 Subtract
  - δ*3.12.1 Proper fractions: restricted denominators
  - 3.12.2 Proper fractions
  - 3.12.3 Mixed numbers
- 3.13 Translate Phrases to Mathematical Symbols
- δ 3.14 Change Mixed Numbers to Improper Fractions
- # 3.15 Multiply
  - δ*3.15.1 Proper/Improper fractions
  - 3.15.2 Mixed numbers
- 3.16 State Reciprocal

MATHEMATICS 8, STANDARD

- 3.17 Divide
  - 3.17.1 Proper fractions
  - 3.17.2 Whole numbers
  - # 3.17.3 Mixed numbers
- 3.18 Change Fractions to Repeating/Terminating Decimal Fractions
- 3.19 Change Decimal Fractions to Fractions/Mixed Numbers
- 3.20 Change to Percents
  - δ*3.20.1 Proper fractions: denominators of 10 or 100
  - 3.20.2 Proper fractions
  - 3.20.3 Mixed numbers
  - 3.20.4 Decimal fractions
- 3.21 Change Percents
  - 3.21.1 Proper fractions
  - 3.21.2 Mixed numbers
  - δ 3.21.3 Decimal fractions
- #δ 3.22 Translate Real-World Problems to Equations

4.0 Geometry

- 4.1 Identify
  - 4.1.1 Point
  - 4.1.2 Line segment
  - 4.1.3 Ray
  - 4.1.4 Plane
- 4.2 Identify Lines
  - 4.2.1 Perpendicular
  - 4.2.2 Parallel
  - 4.2.3 Skew
- #δ 4.3 Identify Angle
- 4.4 Classify Pair of Angles
  - 4.4.1 Complementary/Supplementary
  - 4.4.2 Vertical/Corresponding/Alt. interior/Alt. exterior
- 4.5 Construct
  - 4.5.1 Congruent line segments
  - 4.5.2 Congruent angles
  - 4.5.3 Parallel lines
  - 4.5.4 Perpendicular rays
- 4.6 Bisect Line Segments/Angles
- #δ 4.7 Identify/Classify Polygons
  - 4.7.1 Triangles
  - 4.7.2 Quadrilaterals
  - 4.7.3 5-10 sided figures
- 4.8 Identify Congruent Triangles
  - 4.8.1 SSS
  - 4.8.2 SAS
  - 4.8.3 ASA
- 4.9 Balance Checkbook: Consumer Skill

5.0 Ratio/Proportion/Percent

- # 5.1 Write Ratio as Fraction
- #δ*5.2 Find Unit Rate
- 5.3 Compute Wages: Consumer Skill
- 5.4 Find Cross-Products
- 5.5 Find Missing Terms
- # 5.6 Determine Solutions from Scale Drawings
- # 5.7 Solve Percent Problems
- 5.8 Solve Real-World Problems
  - 5.8.1 Sales tax
  - 5.8.2 Discount
  - 5.8.3 Interest
  - 5.8.4 Percent of change

MATHEMATICS 8, STANDARD

6.0 Probability

- 6.1 Apply Definition
- 6.2 Determine Number of Outcomes
- 6.3 Compare Actual/Expected Probabilities
- 6.4 Reconcile Bank Statement: Consumer Skill
- # 6.5 Determine Probability of Outcomes
  - 6.5.1 Tree diagrams
  - 6.5.2 Two dice
  - 6.5.3 Union/ Intersection
  - 6.5.4 Multiplication rule
- 6.6 Change Probability to Percent
- 6.7 Determine Odds
- #δ 6.8 Identify Extraneous Information

7.0 Statistics

- 7.1 Organize Data
  - 7.1.1 Range
  - 7.1.2 Mode
  - 7.1.3 Median
- # 7.2 Find Mean/Mean Variation
- 7.3 Interpret Data
  - 7.3.1 Mean
  - 7.3.2 Median
  - 7.3.3 Mode
- 7.4 Use Sample Statistics
- #δ 7.5 Identify Insufficient Information

8.0 Integers

- 8.1 Locate on Number Line
- 8.2 Name Opposite
- # 8.3 State Absolute Value
- # 8.4 Add
- # 8.5 Subtract
- # 8.6 Multiply
- 8.7 Divide
- 8.8 Locate/Name Points
- δ 8.9 Solve Real-World Problems

9.0 Graphing

- 9.1 Interpret Information
  - δ*9.1.1 Pictographs
  - δ*9.1.2 Bar graphs
  - # 9.1.3 Line graphs
- 9.2 Interpret/Construct Circle Graphs
- 9.3 Compute Income Tax: Consumer Skill
- 9.4 Use Ordered Pairs
  - δ*9.4.1 Map
  - # 9.4.2 Coordinate system

10.0 Measurement

- # 10.1 Use Metric Prefixes
  - 10.1.1 Length
  - δ 10.1.2 Weight
  - δ 10.1.3 Capacity
- δ 10.2 Measure Length
- 10.3 Determine Temperature
  - δ*10.3.1 Fahrenheit/ Celsius
  - 10.3.2 Conversion of temperature reading

MATHEMATICS 8, STANDARD

- 10.4 Write in Standard Form
  - 10.4.1 Positive exponents
  - 10.4.2 Negative exponents
- 10.5 Measure Angles
- *10.6 Tell Time
- 10.7 Add/Subtract Time Measures
- # 10.8 Find Perimeter of Polygons
- #6*10.9 Solve Linear Measurement Problems
- 10.10 Find Circumference
- 10.11 Find Area
  - # 10.11.1 Parallelograms: rectangles, squares
  - 10.11.2 Triangles
  - 10.11.3 Trapezoids
  - 10.11.4 Circles
  - 10.11.5 Spheres
- 10.12 Find Volume
  - # 10.12.1 Rectangular prisms
  - 10.12.2 Cylinders
  - 10.12.3 Pyramids
  - 10.12.4 Cones
- 10.13 Find Surface Area
  - 10.13.1 Rectangular prisms
  - 10.13.2 Cylinders
  - 10.13.3 Pyramids
  - 10.13.4 Spheres

11.0 Equations/Inequalities

- 11.1 Simplify Numerical Expressions
  - 11.1.1 Grouping symbols
  - 11.1.2 Order of operations
- 11.2 Evaluate Variable Expressions
- # 11.3 Solve Equations
  - 11.3.1 Addition property of equality
  - 11.3.2 Subtraction property of equality
  - 11.3.3 Multiplication property of equality
  - 11.3.4 Division property of equality
  - 11.3.5 Combination
- # 11.4 Solve Inequalities
- 11.5 Compute Finance Charges: Consumer Skill
- 11.6 Recognize/Extend Sequences
- 11.7 Find Sum of Sequences

12.0 Geometric Relationships

- 12.1 Find Square Roots
- 12.2 Solve Problems
  - 12.2.1 Pythagorean theorem
  - 12.2.2 30° - 60° right triangles
  - 12.2.3 Similar triangles

PERFORMANCE OBJECTIVES
MATHEMATICS 8, STANDARD

Mathematics 8 is designed to continue the mathematical development of students who have mastered the skills of seventh grade mathematics. The chapters range from a review of the fundamental operations with whole numbers and decimal fractions to solving equations and inequalities. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Whole Numbers

1.1 Students will round:

- ό*(1) whole numbers less than 10,000 to any designated place; and
- (2) whole numbers greater than 10,000 to any designated place.

1.2 Students will add:

- (1) any two four-digit whole numbers;
- ό*(2) any three four-digit whole numbers; and
- (3) any four five-digit whole numbers.

1.3 Students will subtract:

- # (1) three-digit whole numbers;
- ό*(2) five-digit whole numbers; and
- # (3) six-digit whole numbers.

ό*1.4 Students will solve real-world problems involving addition or subtraction of four-digit whole numbers.

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* Indicates Minimum Level Skills
ό Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

# 1.5 Students will multiply:

- (1) two-digit whole numbers;
- δ*(2) three-digit whole numbers by two-digit whole numbers; and
- (3) three-digit whole numbers.

# 1.6 Students will identify and use properties of addition and multiplication.

δ 1.7 Students will write money values when utilizing the consumer skill of writing checks.

# 1.8 Students will divide:

- δ (1) a whole number by a one-digit whole number;
- δ*(2) a three-digit whole number by a multiple of 10 less than 100, with remainder; and
- (3) a whole number by a two-digit whole number.

1.9 Students will identify the base ten equivalent of a number written in base two.

# 1.10 Students will write in exponential notation numbers written in standard form and reverse.

# 1.11 Students will write in expanded notation numbers written in standard form and reverse.

1.12 Students will solve real-world problems involving:

- δ*(1) multiplication of a three-digit whole number by a two-digit whole number; and
- (2) division of whole numbers.

2.0 Decimals

2.1 Students will write:

# *(1) a decimal fraction that is equivalent to a given proper fraction having a denominator of 10 or 100; and

(2) a decimal fraction that is equivalent to a given proper fraction or mixed number having a denominator of 10, 100, or 1000.

#δ 2.2 Students will round decimal fractions to any designated place.

2.3 Students will compare decimal fractions using <, >, or =.

2.4 Students will estimate the sum and difference of decimal fractions.

2.5 Students will use a grocery receipt to apply rounding and estimating of decimal fractions.

2.6 Students will add:

δ*(1) three decimal fractions with no more than two decimal places in each, regrouping required; and

(2) four decimal fractions with no more than three decimal places in each.

2.7 Students will subtract:

δ*(1) decimal fractions with no more than two decimal places in each, regrouping required; and

(2) decimal fractions with no more than three decimal places.

2.8 Students will identify metric prefixes.

2.9 Students will convert within the metric system.

2.10 Students will compute using modular arithmetic.

2.11 Students will estimate the product and quotient of decimal fractions.

2.12 Students will multiply:

- #δ (1) a whole number and a number having no more than two decimal places;
- δ*(2) two decimal fractions named in tenths and hundredths; and
- # (3) any decimal fraction by any whole number or decimal fraction.

2.13 Students will compute weekly wages given hours worked and hourly rate.

2.14 Students will divide:

- δ*(1) a decimal fraction named in tenths or hundredths by a multiple of ten less than a hundred;
- (2) a decimal fraction or whole number by a one-digit or two-digit whole number where the quotient is a decimal fraction; and
- # (3) a decimal fraction or whole number by any decimal fraction.

2.15 Students will multiply or divide decimal fractions by 10, 100, or 1000.

2.16 Students will solve real-world problems involving:

- (1) sports events; and
- #δ*(2) purchases with change from a twenty dollar bill.

# 2.17 Students will identify and use the distributive property of multiplication over addition.

3.0 Fractions

3.1 Students will find factors of:

- (1) numbers divisible by two, three, five, nine, and ten; and
- (2) any whole number.

3.2 Students will classify whole numbers as (1) prime, or (2) composite.

# 3.3 Students will find prime factorization of composite numbers.

# 3.4 Students will compute the greatest common factor of two numbers.

6*3.5 Students will read and write fractions having denominators of 2, 3, 4, 5, 6, 8, 10, 20, 25, 50, or 100.

3.6 Students will simplify fractions.

3.7 Students will compute the least common multiple of two or three numbers.

# 3.8 Students will compare fractions using <, >, or =.

#6*3.9 Students will identify a fraction which is equivalent to a given proper fraction having a denominator of 2, 3, 4, 5, 6, 8, 10, 20, 25, 50, or 100.

3.10 Students will add and subtract fractions and mixed numbers having like denominators.

3.11 Students will add:

- 6*(1) two proper fractions with denominators of 2, 3, 4, 5, 6, 8, 10, or 16 where the common denominator is not in the problem;
- (2) proper fractions; and
- # (3) mixed numbers.

# 3.12 Students will subtract:

- 6*(1) Two proper fractions with denominators of 2, 3, 4, 5, 6, 8, 10, or 16 where the common denominator is not in the problem;
- (2) proper fractions; and
- (3) mixed numbers.

3.13 Students will translate word phrases into mathematical symbols.

δ 3.14 Students will change mixed numbers to improper fractions.

3.15 Students will multiply:

δ*(1) any two proper or improper fractions; and

(2) mixed numbers.

3.16 Students will state the reciprocal of a given fraction.

3.17 Students will divide:

(1) proper fractions;

(2) whole numbers; and

(3) mixed numbers.

3.18 Students will change fractions to repeating or terminating decimal fractions.

3.19 Students will change decimal fractions to fractions or mixed numbers.

3.20 Students will change to equivalent percents:

δ*(1) proper fractions having denominators of 10 or 100;

(2) proper fractions;

(3) mixed numbers; and

(4) decimal fractions.

3.21 Students will change percents to equivalent:

(1) proper fractions;

(2) mixed numbers; and

δ (3) decimal fractions.

#6 3.22 Students will translate real-world problems to mathematical equations.

4.0 Geometry

4.1 Students will identify a (1) point; (2) line segment; (3) ray; and (4) plane.

4.2 Students will identify lines as (1) perpendicular; (2) parallel; or (3) skew.

#6 4.3 Students will identify an angle as acute, right, or obtuse.

4.4 Students will classify a pair of angles as:

(1) complementary or supplementary, and

(2) vertical, corresponding, alternate interior, or alternate exterior.

4.5 Students will construct:

(1) congruent line segments;

(2) congruent angles;

(3) parallel lines; and

(4) perpendicular rays.

4.6 Students will bisect line segments and angles.

#6 4.7 Students will identify and classify polygons with emphasis on:

(1) triangles;

(2) quadrilaterals; and

(3) five through ten sided figures , inclusive.

4.8 Students will identify congruent triangles by:

- (1) side-side-side;
- (2) side-angle-side; or
- (3) angle-side-angle.

4.9 Students will balance a checkbook when given amount on hand, checks issued, and deposits made.

5.0 Ratio, Proportion, and Percent

5.1 Students will write a ratio as a fraction in simplest form.

#6*5.2 Students will find unit rate when solving real-world problems involving comparison shopping for purchases less than ten dollars.

5.3 Students will compute wages when applying consumer skills.

5.4 Students will find the value of cross-products.

5.5 Students will find missing terms when given proportions having one unknown term.

5.6 Students will determine solutions to problems relating to scale drawings.

5.7 Students will solve percent problems.

5.8 Students will solve real-world problems involving (1) sales tax; (2) discount; (3) interest; and (4) percent of change.

6.0 Probability

6.1 Students will apply the definition of probability to determine the probability of an outcome.

6.2 Students will determine the number of specific outcomes of an event.

6.3 Students will compare actual and expected probabilities of outcomes.

6.4 Students will reconcile a bank statement applying consumer skills.

# 6.5 Students will determine the probability of outcomes of events by:

(1) making tree diagrams;

(2) rolling two dice;

(3) using union or intersection; or

(4) applying the multiplication rule.

6.6 Students will change a probability to a percent.

6.7 Students will determine the odds for an event.

#6 6.8 Students will identify extraneous information when solving real-world problems.

7.0 Statistics

7.1 Students will organize data and find (1) range; (2) mode; and (3) median.

# 7.2 Students will find the mean and mean variation when given a set of data.

7.3 Students will interpret real-world problems using (1) mean; (2) median; and (3) mode.

7.4 Students will use sample statistics to make predictions for a total population.

#6 7.5 Students will identify insufficient information when solving real-world problems.

8.0 Integers

8.1 Students will locate integers on the number line.

8.2 Students will name the opposite of a given integer.

8.3 Students will state the absolute value of a given integer.

8.4 Students will add two integers.

8.5 Students will subtract integers.

8.6 Students will multiply two integers.

8.7 Students will divide integers.

8.8 Students will locate and name points on a coordinate system using ordered pairs.

ó 8.9 Students will solve real-world problems using estimation to check for reasonableness.

9.0 Graphing

9.1 Students will interpret information illustrated by:

- ó*(1) pictographs;
- ó*(2) bar graphs; and
- # (3) line graphs.

9.2 Students will both interpret and construct circle graphs.

9.3 Students will compute income tax using a tax table and applying consumer skills.

9.4 Students will use ordered pairs to:

- ó*(1) locate a point on a highway map; and
- # (2) graph on a coordinate system.

10.0 Measurement

#10.1 Students will use appropriate metric prefixes to estimate measures of:

(1) length;

ó (2) weight; and

ó (3) capacity.

ó 10.2 Students will measure the length of objects to the nearest centimeter and millimeter.

10.3 Students will determine the temperature by:

ó*(1) using Fahrenheit and Celsius thermometers; and

(2) applying the standard conversion formula from Fahrenheit scale to Celsius scale.

10.4 Students will write in standard form numbers written in scientific notation containing (1) positive exponents, and (2) negative exponents.

10.5 Students will measure angles using a protractor.

*10.6 Students will tell time in hours and minutes in different time zones.

10.7 Students will add or subtract time measures to find driving times between cities.

#10.8 Students will find the perimeter of polygons.

#ó*10.9 Students will solve linear measurement problems with centimeters, meters, inches, feet, or yards using addition or subtraction, and no conversion between the English and metric system.

10.10 Students will find the circumference of circles.

10.11 Students will find the area of:

# (1) parallelograms, specifically rectangles and squares;

(2) triangles;

(3) trapezoids;

(4) circles; and

(5) spheres.

10.12 Students will find the volume of:

# (1) rectangular prisms;

(2) cylinders;

(3) pyramids; and

(4) cones.

10.13 Students will find the surface area of:

(1) rectangular prisms;

(2) cylinders;

(3) pyramids; and

(4) spheres.

11.0 Equations and Inequalities

11.1 Students will simplify numerical expressions by (1) grouping symbols; and (2) order of operations.

11.2 Students will evaluate variable expressions when given the values of the variables.

# 11.3 Students will solve equations by using:

(1) the addition property of equality;

(2) the subtraction property of equality;

(3) the multiplication property of equality;

(4) the division property of equality; or

(5) a combination of properties.

# 11.4 Students will solve inequalities.

11.5 Students will compute finance charges.

11.6 Students will recognize and extend sequences.

11.7 Students will find the sum of arithmetic sequences.

12.0 Geometric Relationships

12.1 Students will find the square roots of numbers by the use of a square root table.

12.2 Students will solve problems involving:

(1) the Pythagorean theorem;

(2) 30°-60° right triangles; and

(3) similar triangles.

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
MATHEMATICS 8, STANDARD

Performance Objective		Instructional Implications		Resources	
Number	Topic	Teaching Time	Tested on	County Adopted	Supplementary
FOR TEACHING TIME SEE TEACHING GUIDE IN TEACHER'S EDITION, PP. T-12 THROUGH T-19. FOR SPECIFIC TESTS ON PERFORMANCE OBJECTIVES, SEE COURSE OUTLINE.				Glen Vanatta, et al, Mathematics: Essentials and Applications (Columbus, Ohio: Charles E. Merrill Publishing Co., 1980).	Eighth Grade Mathematics Teacher's Manual for Florida State Assessment Program (Duval County Public Schools, 1980). Glen Vanatta, et al, Mathematics: Essentials and Applications: Enrichment and Remediation Program (Columbus, Ohio: Charles E. Merrill Publishing Co., 1980). Glen Vanatta, et al, Mathematics: Essentials and Applications: Evaluation and Diagnostic Program (Columbus, Ohio: Charles E. Merrill Publishing Co., 1980). Glen Vanatta, et al, Mathematics: Essentials and Applications: Practice and Activities Workbook (Columbus, Ohio: Charles E. Merrill Publishing Co., 1980).

INTRODUCTION

MATHEMATICS, CONSUMER (SEMESTER)

State Accreditator Number. .	2285
Course Code Number	1716
F.T.E. Category.	1.10
Instructional Level.	Standard

Report Card Abbreviation . .	CONSUMER MATH
Length of Course	Semester
Credit	1/2 Math Credit
Grade Level.	10, 11, 12

Prerequisites

Mastery of Basic Skills

Textbook(s)

Bolster, L. Carey, et al, Consumer and Career Mathematics (Glenview, Illinois: Scott, Foresman, and Company, 1978).

Notes to Teachers

Students will master the concepts and skills developed for Consumer Math, Semester as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills (MLST).

COURSE OUTLINE

MATHEMATICS, CONSUMER (SEMESTER)

1.0 Review of Basic Skills

- *1.1 Perform Operations With Common Fractions
- 1.2 Perform Operations With Mixed Numbers
- *1.3 Perform Operations With Decimal Fractions
- 1.4 Convert Fractions To Decimal Equivalents
- 1.5 Convert Between Fractions, Decimals, and Percents
  - 1.5.1 Fractions or decimals to percents
  - 1.5.2 Percents to decimals
- 1.6 Solve percent problems
  - *1.6.1 a% of b = ___
  - *1.6.2 ___% of b = c
  - 1.6.3 a% of ___ = c

2.0 Transportation

- *2.1 Find Cost of Car Purchase
  - 2.1.1 Monthly payment
  - 2.1.2 Total cost
  - 2.1.3 Cost of loan
- *2.2 Solve Problems About Car Operation, Including Miles Per Gallon
- 2.3 Compute Cost of Insurance

3.0 Consumer Goods Purchases

- *3.1 Determine Change
- *3.2 Determine Cheaper Buy With Unit Pricing
- *3.3 Solve Problems, Special-Sale Items
  - 3.3.1 Amount of discount
  - 3.3.2 New selling price
- *3.4 Solve Sales Tax Problems
  - 3.4.1 Amount of tax
  - 3.4.2 Total purchase price

4.0 Income

- *4.1 Compute Hourly Wages
  - 4.1.1 Regular
  - 4.1.2 Overtime
- *4.2 Compute Piece-Rate Wages
- *4.3 Compute Commission-Based Wages
  - 4.3.1 Commission only
  - 4.3.2 Commission & salary

*Indicates Minimum Level Skills

PERFORMANCE OBJECTIVES
MATHEMATICS, CONSUMER (SEMESTER)

Consumer Mathematics is a course designed to help students function more successfully as members of the community. The skills mastered in previous mathematics courses are used to solve some of the problems of consumers. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Review of Basic Skills

*1.1 Students will perform the fundamental operations of arithmetic with common fractions expressing the answers in simplest form.

1.2 Students will perform the fundamental operations of arithmetic with mixed numbers expressing the answers in simplest form.

*1.3 Students will perform the fundamental operations of arithmetic with decimal fractions, rounding the answers to designated places.

1.4 Students will convert fractions to their decimal equivalents.

1.5 Students will convert (1) given fractions or decimals to percent equivalents and (2) given percents to decimal equivalents.

1.6 Students will solve problems:

*(1) finding a percent of a given number (a% of b = ___).

*(2) finding what percent one given number is of another (___% of b = c), and

(3) finding the original number when a percent of it is given (a% of ___ = c).

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*Indicates Minimum Level Skills

2.0 Transportation

*2.1 Students will find the cost of buying a new or used car by computing the (1) monthly payments, (2) total cost, and (3) cost of the loan.

*2.2 Students will solve problems about the expenses of operating a car, including miles per gallon.

2.3 Students will use appropriate tables to compute the cost of car insurance.

3.0 Consumer Goods Purchases

*3.1 Students will determine the amount of change consumers will get from a $1, $5, $10, or $20 dollar bill when given the cost of a purchase.

*3.2 Students will compare the unit price of two or more items and select the least expensive item based on unit-price comparison.

*3.3 To demonstrate knowledge of problems dealing with special-sale items, students will:

(1) determine the amount of discount on items, and

(2) determine the special-sale price (new selling price) of items.

*3.4 Given the cost of an item and the rate of the sales tax, students will compute (1) the amount of sales tax to be paid and (2) the total purchase price (amount of purchase plus sales tax).

4.0 Income

*4.1 Students will compute wages (1) based on a regular hourly rate (no overtime) and (2) based on a regular hourly plus overtime rate.

*4.2 Students will compute weekly piece-rate wages when given the number of pieces completed and the per-piece wage.

*4.3 Students will compute commission-based wages (1) when wages are determined from commissions only and (2) when wages are determined by a salary plus commissions.

INTRODUCTION

MATHEMATICS, CONSUMER (YEAR)

State Accreditator Number. .	2285
Course Code Number	1717
F.T.E. Category.	1.10
Instructional Level.	Standard

Report Card Abbreviation . .	CONSUMER MATH
Length of Course	Year
Credit	1 Math Credit
Grade Level.	10, 11, 12

Prerequisites

Math Teacher Recommendation/Mastery of Basic Skills

Textbook(s)

Kravitz, Wallace W., et al, Consumer Related Mathematics (New York: Holt, Rinehart, & Winston, 1976.) (Junior High)

Bolster, L. Carey, et al, Consumer and Career Mathematics (Glenview, Illinois: Scott, Foresman, and Company, 1978). (Senior High)

Notes to Teachers

Students will master the concepts and skills developed for Mathematics, Consumer as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

MATHEMATICS, CONSUMER (YEAR)

1.0 Review of Basic Skills

- 1.1 Perform Operations with Common Fractions
- 1.2 Perform Operations with Mixed Numbers
- 1.3 Perform Operations with Decimal Fractions
- 1.4 Convert Fractions to Decimal Equivalents
- 1.5 Convert Between Fractions, Decimals, and Percents
  - 1.5.1 Fractions or decimals to percents
  - 1.5.2 Percents to decimals
- 1.6 Solve Percent Problems
  - 1.6.1 a% of b = ___
  - 1.6.2 ___% of b = c
  - 1.6.3 a% of ___ = c

2.0 Transportation

- *2.1 Find Cost of Car Purchase
  - 2.1.1 Monthly payment
  - 2.1.2 Total cost
  - 2.1.3 Cost of loan
- *2.2 Solve Problems About Car Operation, Including Miles Per Gallon
- 2.3 Compute Cost of Insurance
- 2.4 Compute Cost of a Trip
  - 2.4.1 Bus
  - 2.4.2 Airplane

3.0 Consumer Goods Purchases

- *3.1 Determine Change
- *3.2 Determine Cheaper Buy By Unit Pricing
- 3.3 Solve Problems, Special-sale Items
  - *3.3.1 Amount of discount
  - *3.3.2 Special-sale price
  - 3.3.3 Rate of discount
- *3.4 Solve Problems, Long-Term Purchases
  - 3.4.1 Installment loans
  - 3.4.2 Charge accounts
- *3.5 Solve Sales Tax Problems
  - 3.5.1 Amount of tax
  - 3.5.2 Total purchase price

4.0 Income

- *4.1 Compute Hourly Wages
  - 4.1.1 Regular
  - 4.1.2 Overtime
- *4.2 Compute Piece-Rate Wages
- *4.3 Compute Commission-Based Wages
  - 4.3.1 Commission only
  - 4.3.2 Commission/Salary
- *4.4 Compute Take-Home Pay
- 4.5 Complete Income Tax Form

5.0 Banking

- 5.1 Solve Problems, Savings Accounts
  - *5.1.1 Determine simple interest
  - 5.1.2 Determine compound interest
  - 5.1.3 Compute accumulated regular savings
- *5.2 Solve Problems, Checking Accounts
  - 5.2.1 Completing deposit slips and checks
  - 5.2.2 Reconciling bank statements
- 5.3 Solve problems, Bank Loans
  - 5.3.1 Discount and proceeds
  - 5.3.2 Borrowing

*Indicates Minimum Level Skills

MATHEMATICS, CONSUMER (YEAR)

6.0 Housing

- *6.1 Compute Cost of Utilities
- 6.2 Compute Real Estate Taxes
- 6.3 Compute the Cost of Insurance
  - 6.3.1 Home Owners
  - 6.3.2 Fire
- 6.4 Determine Monthly Cost of Buying a Home
- 6.5 Compute Cost of Renting
  - 6.5.1 House
  - 6.5.2 Apartment

PERFORMANCE OBJECTIVES
MATHEMATICS, CONSUMER (YEAR)

Consumer Mathematics is a course designed to help students function more successfully as members of the community. The skills mastered for the state assessment test are employed to solve problems of daily life. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test. All Minimum Level Skills are tested by the Florida State Assessment Program.

Performance Objectives

1.0 Review of Basic Skills

1.1 Students will perform the fundamental operations of arithmetic with common fractions expressing the answers in simplest form.

1.2 Students will perform the fundamental operations of arithmetic with mixed numbers expressing the answers in simplest form.

1.3 Students will perform the fundamental operations of arithmetic with decimal fractions, rounding the answers to designated places.

1.4 Students will convert fractions to their decimal equivalents.

1.5 Students will convert (1) given fractions or decimals to percent equivalents and (2) given percents to decimal equivalents.

1.6 Students will solve problems (1) finding a percent of a given number, (2) finding what percent one given number is of another, and (3) finding the original number when a percent of it is given.

2.0 Transportation

*2.1 Students will find the cost of buying a new or used car by computing the (1) monthly payments, (2) total cost, and (3) cost of the loan.

*2.2 Students will solve problems about the expenses of operating a car, including miles per gallon.

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*Indicates Minimum Level Skills

2.3 Students will use appropriate tables to compute the cost of car insurance.

2.4 Students will compute the cost of (1) a trip by bus and (2) a trip by airplane.

3.0 Consumer Goods Purchases

*3.1 Students will determine the amount of change consumers will get from a $1, $5, $10, or $20 dollar bill when given the cost of a purchase.

*3.2 Students will compare the unit price of two or more items and select the least expensive item based on the unit-price comparison.

3.3 To demonstrate knowledge of problems dealing with special-sale items, students will:

*(1) determine the amount of discount on items,

*(2) determine the special-sale price (new selling price) of items, and

(3) compute the rate of discount when given the regular price and a special-sale price.

*3.4 To demonstrate knowledge of problems dealing with long-term purchases, students will:

(1) determine the monthly payment when given the total cost and the down payment or the total cost when given the down payment and the monthly payment, and

(2) determine the carrying charge (service charge) when given the amount charged and the rate of the carrying charge or the balance due when given the amount charged and the rate of the carrying charge (service charge).

*3.5 Given the cost of an item and the rate of the sales tax, students will compute (1) the amount of sales tax to be paid and (2) the total purchase price (amount of purchase plus sales tax).

4.0 Income

*4.1 Students will compute wages (1) based on a regular hourly rate (no overtime) and (2) based on a regular hourly plus overtime rate.

*4.2 Students will compute weekly piece-rate wages when given the number of pieces completed and the per-piece wage.

*4.3 Students will compute commission-based wages (1) when wages are determined from commissions only and (2) when wages are determined by a salary plus commissions.

*4.4 Students will compute take-home pay when given the amount of the weekly wage and the amount of the deductions.

4.5 Students will complete an income tax form when given the appropriate information for either the short form or for the long form.

5.0 Banking

5.1 To demonstrate knowledge of problems dealing with savings accounts, students will:

*(1) determine the simple interest earned when given an amount of money and a period of time,

(2) determine the compound interest earned when given an amount of money, a period of time, and how the interest is compounded (annually, semi-annually, quarterly), and

(3) compute the accumulated regular savings when given the amount saved, an interest rate, and a period of time.

*5.2 To demonstrate knowledge of problems dealing with checking accounts, students will:

(1) fill out a deposit slip, write a check, and fill in the check stub, and

(2) reconcile a bank statement when given appropriate information.

5.3 Students will (1) determine the proceeds resulting from discounting a loan and (2) determine the amount of monthly payments, the amount of interest paid, and the total cost of an item when financed by a bank.

6.0 Housing

*6.1 Students will compute the cost of utilities when given the cost of electricity, water and sewage, telephone, and heating costs.

6.2 Students will compute real estate taxes.

6.3 Students will use appropriate tables to compute (1) the cost of home owners insurance and (2) the cost of fire insurance.

6.4 Students will determine the total monthly cost of buying a home.

6.5 Students will compute the cost of renting (1) a house and (2) an apartment.

INTRODUCTION
PRE-ALGEBRA

State Accreditator Number	2210
Course Code Number	1532
F.T.E. Category	1.10
Instructional Level	Standard

Report Card Abbreviation	PRE ALG
Length of Course	Year
Credit	1 Math Credit
Grade Level	8,9,10,11,12

Prerequisites

Math Teacher Recommendation/Mastery of Basic Skills

Textbook(s)

Shulte, Albert P., et al, Preparing to Use Algebra (Atlanta: Laidlaw, 1978.)

Supplementary Materials

Bramson, Morris, Algebra: An Introductory Course (New York: Amsco School Publications, Inc., 1978.)

Denholm, Richard A., et al, Elementary Algebra, Part 1 (Boston: Houghton Mifflin Company, 1977.)

Dressler, Isidore, Algebra 1: Review-Guide (New York: Amsco School Publication, Inc., 1966.)

Marcy, Janis and Steve Marcy, Pre-Algebra With Pizzazz (Palo Alto, California: Creative Publications, Inc., 1978.)

Notes to Teachers

Students will master the concepts and skills developed for Pre-Algebra as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

PRE-ALGEBRA

1.0 Arithmetic Review

- δ*1.1 Perform Fundamental Operations
  - # 1.1.1 Whole numbers
  - # 1.1.2 Fractions
  - 1.1.3 Decimals
- δ*1.2 Write Equivalent Expressions
  - # 1.2.1 Fractions to decimals
  - 1.2.2 Decimals to fractions
  - 1.2.3 Fractions to percents
  - 1.2.4 Percents to fractions
  - 1.2.5 Decimals to percents
  - 1.2.6 Percents to decimals
- 1.3 Solve Percent Problems
  - #δ*1.3.1 a% of b = ___
  - # *1.3.2 ___% of b = c
  - # *1.3.3 a% of ___ = c
  - δ 1.3.4 Discount
  - δ 1.3.5 Simple interest
- *1.4 Round Off
  - 1.4.1 Whole numbers
  - #δ 1.4.2 Decimals

2.0 Number Theory

- 2.1 Define Factor
- *2.2 Factor Whole Numbers
- 2.3 Define Exponent
- # 2.4 Define Prime/Composite Numbers
- # *2.5 Identify Prime/Composite Numbers
- 2.6 Write Prime Factorization
  - 2.6.1 Without exponents
  - 2.6.2 With exponents
- *2.7 Find Greatest Common Factor
- # *2.8 Find Least Common Multiple
- 2.9 State Tests for Divisibility
- 2.10 Determine Divisors
- 2.11 Express in Scientific Notation
  - 2.11.1 Decimal form to scientific notation
  - # 2.11.2 Scientific notation to decimal form

3.0 Properties

- 3.1 Identify Properties
  - *3.1.1 Commutative
  - *3.1.2 Associative
  - 3.1.3 Additive identity
  - 3.1.4 Multiplicative property of zero
  - # 3.1.5 Multiplicative identity
  - # *3.1.6 Distributive
- 3.2 Compute Using Properties

4.0 Operations with Signed Numbers

- *4.1 State Opposites
- 4.2 State Reciprocals
- *4.3 State Absolute Value
- # *4.4 Perform Fundamental Operations
- 4.5 Square Whole Numbers
- 4.6 Find Square Roots
  - 4.6.1 Read table
  - 4.6.2 Estimate

5.0 Equations/Inequalities

- # *5.1 Simplify Numerical Expressions
- 5.2 Define Variable
- 5.3 Translate Phrases & Sentences
  - *5.3.1 Word phrases to math phrases
  - 5.3.2 Math phrases to word phrases
  - δ*5.3.3 Word sentences to math sentences
- # *5.4 Evaluate Phrases
- 5.5 Use Set Language
  - 5.5.1 Replacement set
  - 5.5.2 Solution set
  - 5.5.3 Empty set
- # *5.6 Solve 1st-Degree Equations, 1 Variable

* Indicates Minimum Level Skills
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

PRE-ALGEBRA

- 5.7 Solve 1st-Degree Inequalities, 1 Variable
- 5.8 Solve Ratin & Proportion Problems
- 5.9 Graph on Number Line
    - 5.9.1 Solution sets of equations
    - 5.9.2 Solution sets of inequalities
- 5.10 Solve Verbal Problems
    - 5.10.1 Equations, 1 variable
    - 5.10.2 Inequalities, 1 variable

6.0 Relations & Functions

- 6.1 Define Ordered Pair
- 6.2 Identify Components
- *6.3 Plot Ordered Pairs
- 6.4 Define Relation
- 6.5 Define Function
- 6.6 Distinguish Between Relations & Function
    - 6.6.1 Sets of ordered pairs
    - 6.6.2 Graph
- 6.7. Find Second Component Using Function Rule

7.0 Metric System

- # 7.1 Identify Prefixes
- #δ*7.2 Convert Within Metric System

8.0 Informal Geometry

- 8.1 Compute Perimeter
    - 8.1.1 Quadrilateral
    - 8.1.2 Triangle
- 8.2 Compute Area
    - 8.2.1 Quadrilateral
    - 8.2.2 Circle
- 8.3 Apply Pythagorean Theorem
    - 8.3.1 Find missing terms
    - 8.3.2 Identify right triangles

PERFORMANCE OBJECTIVES
PRE-ALGEBRA

This course is designed for two groups of students: (1) those who are developing the skills necessary for success in Algebra and (2) those who may not pursue a college-preparatory mathematics program but wish to continue their investigation of the field of mathematics. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Arithmetic Review

δ*1.1 Students will perform the fundamental operations on # (1) whole numbers, # (2) fractions, and (3) decimals.

δ*1.2 To demonstrate knowledge of fractions having denominators of 2, 3, 4, 5, 8, 10, and 20, and six-digit decimals with no more than three decimal places, students will write equivalent expressions for the conversion of:

(1) fractions to decimals,

(2) decimals to fractions,

(3) fractions to whole number percents,

(4) whole number percents to fractions,

(5) decimals to percents, and

(6) percents to decimals.

1.3 Students will solve given percent problems including:

#δ*(1) a% of b = ___,

*(2) ___% of b = c,

*(3) a% of ___ = c,

δ (4) discount, and

δ (5) simple interest.

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* Indicates Minimum Level Skills
δ Indicates State Student Assessment Program
# Indicates Stanford Achievement Test

*1.4 Students will round (1) whole numbers to the nearest ten's, hundred's, and thousand's place and #6 (2) six-digit decimals with no more than three places to the nearest hundredth, tenth, or unit.

2.0 Number Theory

2.1 Students will define factor in terms of whole numbers.

*2.2 Students will factor two-digit whole numbers.

2.3 Students will define exponent.

2.4 Students will define prime and composite numbers.

*2.5 Students will identify prime and composite numbers.

2.6 Students will write the prime factorization of three-digit whole numbers (1) without exponents and (2) with exponents.

*2.7 Students will find the greatest common factor of two three-digit whole numbers.

*2.8 Students will find the least common multiple of three two-digit whole numbers.

2.9 Students will state the tests for divisibility by 2, 3, 5, 9, and 10.

2.10 Students will determine which of the listed divisors are factors of given six-digit whole numbers.

2.11 Students will express numbers in scientific notation including converting from (1) decimal form to scientific notation and # (2) scientific notation to decimal form.

3.0 Properties

3.1 Students will identify the properties:

*(1) commutative,

*(2) associative,

(3) additive identity,

(4) multiplicative property of zero,

(5) multiplicative identity, and

*(6) distributive.

3.2 Students will compute fundamental operations using properties.

4.0 Operations With Signed Numbers

*4.1 Students will state the opposite of given rational numbers.

4.2 Students will state the reciprocal of given rational numbers.

*4.3 Students will state the absolute value of given rational numbers.

# *4.4 Students will perform the fundamental operations on given pairs of signed rational numbers.

4.5 Students will square three-digit whole numbers.

4.6 Students will find the square roots of three-digit whole numbers by (1) reading a table or (2) estimating.

5.0 Equations and Inequalities

# *5.1 Students will simplify numerical expressions by using the order of operations including the use of parentheses, but excluding the use of exponents.

5.2 Students will define the term variable.

5.3 Students will translate:

*(1) word phrases to mathematical expressions,

(2) mathematical expressions to word phrases, and

6*(3 word sentences to first-degree equations or inequalities in one variable.

# *5.4 Students will evaluate algebraic phrases involving one variable when given the replacement set for that variable.

5.5 Students will use set language including (1) replacement set, (2) solution set, and (3) empty set.

*5.6 Students will solve first-degree equations in one variable.

5.7 Students will solve first-degree inequalities in one variable.

5.8 Students will solve ratio and proportion problems.

5.9 Students will graph on the number line the solution sets of (1) first-degree equations and (2) first-degree inequalities.

5.10 Students will solve verbal problems requiring one variable using (1) first-degree equations or (2) first-degree inequalities.

6.0 Relations and Functions

6.1 Students will define an ordered pair.

6.2 Students will identify the components of a given set of ordered pairs.

*6.3 Students will plot the graph of an ordered pair on a coordinate plane.

6.4 Students will define relation.

6.5 Students will define function.

6.6 Students will distinguish between relations and functions when given (1) a set of ordered pairs or (2) a graph.

6.7 Students will find the second component of an ordered pair when given the function rule and the first component.

7.0 Metric System

# 7.1 Students will identify the prefixes of the metric system.

#δ*7.2 Students will convert between units within the metric system.

8.0 Informal Geometry

8.1 Students will compute the perimeter when given a labeled figure of (1) a quadrilateral or (2) a triangle.

8.2 Students will compute the area when given a labeled figure of (1) a quadrilateral or (2) a circle.

8.3 Students will apply the Pythagorean Theorem to (1) find the missing term or (2) identify a triangle as a right triangle.

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
				County Adopted *Preparing to Use Algebra*	Supplementary Instructional Materials			
Number	Topic	Teaching Time	Tested On	TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
1.0	ARITHMETIC REVIEW	6 Weeks						
1.1	Perform Fundamental Operations							
1)	Whole numbers		MLST SSAP SAT			278 281-285, 289-291		
2)	Fractions		MLST SSAP SAT	155-179		56-63, 65-70	65,71, 86-87, 90-91	
3)	Decimals		MLST SSAP	194-201		87-95	71,93,96, 117	
1.2	Write Equivalent Expressions							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
				County Adopted Preparing to Use Algebra	Supplementary Instructional Materials			
Number	Topic	Teaching Time	Tested On	TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
1)	Fractions to decimals		MLST SSAP SAT	191-192		85-86	74	
2)	Decimals to fractions		MLST SSAP	320		127-128	74	
3)	Fractions to percents		MLST SSAP	315-316, 318-320		127-128	74	BB36, 38-39
4)	Percents to fractions		MLST SSAP	320		125	74	BB34-35
5)	Decimals to percents		MLST SSAP	320		124-125	74	
6)	Percents to decimals		MLST SSAP	320			74	BB40
1.3	Solve Percent Problems							
1)	a% of b = ___		MLST SSAP SAT	323,326	223-225	131		BB41-45, 51-54

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KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted *Preparing to Use Algebra*	Supplementary Instructional Materials			
				TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
2)	___% of b = c		MLST SAT	323,326	223-225	134		BB46-48, 51-54
3)	a% of ___ = c		MLST SAT	323,326	223,326	136-137		BB49-54
4)	Discount		SSAP			138-140		
5)	Simple interest		SSAP	417-418		143-145		
1.4	Round Off							
1)	Whole numbers		MLST	429-430, 432				
2)	Decimals		MLST SSAP SAT					
2.0	NUMBER THEORY	2 Weeks						
2.1	Define Factor			103	52,259	19	59	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS

PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted *Preparing to Use Algebra*	Supplementary Instructional Materials			
				TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
2.2	Factor Whole Numbers		MLST	103,108,109	259-260		59	
2.3	Define Exponent			111	53	163	23,346	
2.4	Define Prime/ Composite Numbers		SAT	108	259-260		62,382	
2.5	Identify Prime/ Composite Numbers		MLST SAT	108	259		62,382	
2.6	Write Prime Factorization							
1)	Without exponents			109, 111-112			382	
2)	With exponents			111-112			382	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS

PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted Preparing to Use Algebra	Supplementary Instructional Materials			
				TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
2.7	Find Greatest Common Factor		MLST	118-119, 161	259-260		59	
2.8	Find Least Common Multiple		MLST SAT	120-121, 176-177			56	
2.9	State Tests for Divisibility			106-107				
2.10	Determine Divisors			106-107				
2.11	Express in Scientific Notation							
1)	Decimal form to scientific notation			208-209			312-313	BB21-23
2)	Scientific notation to decimal form		SAT	208-209			312-313	BB21-23

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
				County Adopted Preparing to Use Algebra	Supplementary Instructional Materials			
Number	Topic	Teaching Time	Tested On	TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
3.0	PROPERTIES	1 Week						
3.1	Identify Properties							
1)	Commutative		MLST	136-137	64,67	65,183, 190,279, 285	162,246, 267	AA65
2)	Associative		MLST	140-141	64-65, 67-68	183,190, 279,285	162-163, 246,267	AA65
3)	Additive identity			143	122		173,240, 246-330	AA63-64
4)	Multiplicative property of zero			143	73,130		173	AA63-64
5)	Multiplicative identity		SAT	143-144	130		173	AA63-64

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS

PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
				County Adopted *Preparing to Use Algebra*	Supplementary Instructional Materials			
Number	Topic	Teaching Time	Tested On	TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
6)	Distributive		MLST SAT	145-146	70-71	199,216, 285	166,169, 267	AA44, 66-67
3.2	Compute Using Properties			136-146	65, 68-69, 70-71, 74	65,183, 190,199, 216,279, 285	162-163, 173,246, 267	
4.0	OPERATIONS WITH SIGNED NUMBERS	2 Weeks						
4.1	State Opposites		MLST	219	111-112		34,212, 240-241	
4.2	State Reciprocals			169	139-141		90, 278-279	AA46
4.3	State Absolute Value		MLST	223	113-114		261	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
				County Adopted Preparing to Use Algebra	Supplementary Instructional Materials			
Number	Topic	Teaching Time	Tested On	TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
4.4	Perform Fundamental Operations		MLST SAT	221,223-224, 226,228,230, 232-233,240, 273	118-121, 127-128, 133-135, 137-141	181-183, 185-186, 189-190, 192-193	212-289	AA13-32, 33-45, 47-50, 52-62
4.5	Square Whole Numbers			111,114			23	
4.6	Find Square Roots			457-458, 463-464, 466,468	451-452			CC47-50
1)	Read table			461	462-463			CC47
2)	Estimate			459,480				
5.0	EQUATIONS/ INEQUALITIES	19 Weeks						
5.1	Simplify Numerical Expressions		MLST	2-3	14-18	6-7	2,100, 101	DD8-9
5.2	Define Variable			5	39		8	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted *Preparing to Use Algebra*	Supplementary Instructional Materials			
				TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
5.3	Translate Phrases and Sentences							
1)	Word phrases to math phrases		MLST SAT	277,279	19-20, 45-48, 80-81		134-136	DD39
2)	Math phrases to word phrases				80-81			
3)	Word sentences to math sentences		MLST SSAP	218,284, 287,290, 291,410	88-89		196	
5.4	Evaluate Phrases		MLST SAT	3.5	54-57		104	DD11-12, 15-17, 8-20, 23-24
5.5	Use Set Language							
1)	Replacement set			11	39		104	

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS

PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted *Preparing to Use Algebra*	Supplementary Instructional Materials			
				TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
2)	Solution set			11	39	263	124	
3)	Empty set			12	40	294	30,124	
5.6	Solve 1st-Degree Equations, 1 Variable		MLST SAT	34,37,244, 246,249, 268-269	83-89, 90-91, 96-98, 175-179	17-27, 224-229, 233-234	127,130, 186,189, 191,194, 278-279, 292,295, 298-299	DD29-34
5.7	Solve 1st-Degree Inequalities, 1 Variable			40,43,225, 260-261, 263-264	194-198	266-268	305, 308-309	
5.8	Solve Ratio/ Proportion Problems			309,312, 402	424-425, 430-431	107, 109-111, 113-115	68-70	BB30-32
5.9	Graph on Number Line							

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS

PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted *Preparing to Use Algebra*	Supplementary Instructional Materials			
				TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
1)	Solution sets of equations			23, 46,257	103-104		124-125	
2)	Solution sets of inequalities			23,46 257-258, 266		267	225-226, 228-229, 305, 308-309	DD46
5.10	Solve Verbal Problems							
1)	Equations, 1 Variable			284,287, 290,291	88-89, 200-202	34-43	196-200, 202-203	DD40-41
2)	Inequalities, 1 Variable			283	256-257	268-269	146	DD47-49
6.0	RELATIONS/ FUNCTIONS	1 Week						
6.1	Define Ordered Pair			70	360	252	47,110	DD54-56
6.2	Identify Components			70				

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
Number	Topic	Teaching Time	Tested On	County Adopted Preparing to Use Algebra	Supplementary Instructional Materials			
				TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
6.3	Plot Ordered Pairs		MLST	73-74	362	252	47	
6.4	Define Relation				561			
6.5	Define Function			76-77	568-569		110-111, 175	
6.6	Distinguish between Relations/ Functions							
1)	Sets of ordered pairs			77	568-569			
2)	Graph			80-81	568-569		175	
6.7	Find Second Component Using Function Rule			84-85	568-569		175	DD57-61

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS
PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
				County Adopted *Preparing to Use Algebra*	Supplementary Instructional Materials			
Number	Topic	Teaching Time	Tested On	TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
7.0	METRIC SYSTEM	2 Days						
7.1	Identify Prefixes		SAT	443-444				
7.2	Convert Within Metic System		MLST SSAP SAT	443-444		152-153	78	CC24-26
8.0	INFORMAL GEOMETRY	1 Week						
8.1	Compute Perimeter							
1)	Quadrilateral							CC27-31
2)	Triangle					2-3		CC27-31
8.2	Compute Area							
1)	Quadrilateral							CC35-37

KEY TO RECOMMENDED INSTRUCTIONAL MATERIALS

PRE-ALGEBRA

Performance Objective		Instructional Implications		Resources				
				County Adopted Preparing to Use Algebra	Supplementary Instructional Materials			
Number	Topic	Teaching Time	Tested On	TEXT	ALGEBRA 1 AMSCO	ALGEBRA AMSCO	ALGEBRA PART 1	PIZZAZZ
2)	Circle			168,204		166-167		CC41
8.3	Apply Pythagorean Theorem							
1)	Find missing terms			472-473, 476	501			CC51,53
2)	Identify right triangles				500			

INTRODUCTION
PROBABILITY AND STATISTICS

State Accreditator Number. .	2293
Course Code Number	1727
F.T.E. Category.	1.10
Instructional Level.	Advanced

Report Card Abbreviation . .	ADV PROB/STAT
Length of Course	Semester
Credit	1/2 Math Credit
Grade Level.	11, 12

Prerequisites

Algebra II/Math Teacher Recommendation

Textbook(s)

Willoughby, Stephen S., et al, Probability and Statistics (Atlanta: Silver Burdett, 1968.)

Notes to Teachers

Students will master the concepts and skills developed for Probability and Statistics as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

COURSE OUTLINE

PROBABILITY AND STATISTICS

- 1.0 Probability Concepts
  - *1.1 Sample Spaces
  - *1.2 Cartesian Products
  - *1.3 Identify Events
  - *1.4 Intersections
  - *1.5 Unions
  - *1.6 Complements
- 2.0 Permutations/Combinations
  - *2.1 Tree Diagrams
  - *2.2 Multiplication Principle
  - 2.3 Addition Principle
  - *2.4 Factorial Notation
  - *2.5 Permutations ${}_nP_n$
  - *2.6 Permutations ${}_nP_r$
  - 2.7 Permutations, Not All Different
  - *2.8 Combinations ${}_nC_r$
  - 2.9 Select Subsets, Two or More Sets
- 3.0 Binomial Theorem
  - *3.1 Combination Notation
    - 3.1.1 Simplify expressions
    - 3.1.2 Solve equations
  - 3.2 Determine Coefficients
  - *3.3 Find Terms
  - 3.4 Expand Binomials
- 4.0 Probability
  - *4.1 Events
  - *4.2 Complementary Events
  - *4.3 Union of Events
    - 4.3.1 Mutually exclusive
    - 4.3.2 Not mutually exclusive
  - *4.4 Independent Events
  - 4.5 Conditional Probability, Independent Events
  - 4.6 Mutually exclusive Events, Bayes' Theorem
  - 4.7 Random Drawing Problems
    - 4.7.1 Sample Spaces
    - 4.7.2 Probability
  - 4.8 Random Number Table
- 5.0 Organizing and Processing Data
  - *5.1 Graphs
    - 5.1.1 Bar
    - 5.1.2 Picture
    - 5.1.3 Line
  - 5.2 Construct Frequency Tables
  - *5.3 Measures of Central Tendencies
    - 5.3.1 Mode
    - 5.3.2 Median
    - 5.3.3 Mean
  - *5.4 Standard Deviation
  - 5.5 Find Variances
  - 5.6 Chebyshev's Theorem
    - 5.6.1 Percentage within interval
    - 5.6.2 Interval to include random variables
- 6.0 Binomial and Normal Distributions
  - 6.1 Properties, Binomial Experiments
  - 6.2 Distribution Tables
  - 6.3 Histograms, Binomial Distribution
  - *6.4 Areas Under Normal Curve
  - 6.5 Random Variable Within Interval
  - 6.6 Standard Normal Distribution
  - 6.7 Test Scores, Percentiles
- 7.0 Inferential Statistics
  - 7.1 Mean of Means
  - 7.2 Standard Deviation of Means
  - 7.3 Controlled Sampling
    - 7.3.1 Mean
    - 7.3.2 Standard Deviation
    - 7.3.3 Confidence intervals

*Indicates Minimum Level Skills

PERFORMANCE OBJECTIVES
PROBABILITY AND STATISTICS

Probability and Statistics is an advanced course dealing with the purely chance phenomena as well as with the science of collecting data, analyzing data, and making inferences from the data. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Probability Concepts

*1.1 Students will list sample spaces for given experiments.

* 1.2 Students will find Cartesian products of given sets.

*1.3 Students will identify events from given sample spaces.

*1.4 Students will find intersections of given events.

*1.5 Students will find unions of given events.

*1.6 Students will find complements of given events.

2.0 Probability Concepts

*2.1 Students will list the possible outcomes of given experiments by making tree diagrams.

*2.2 Students will list the possible outcomes of given experiments by using the multiplication principle.

2.3 Students will list the possible outcomes of given experiments by using the addition principle.

*2.4 Students will simplify mathematical expressions containing factorial notations.

*2.5 Students will find the number of permutations of n things taken n at a time (linear),

$_nP_n = n!$

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*Indicates Minimum Level Skills

*2.6 Students will find the number of permutations of n things taken r at a time (linear),

$$_nP_r = \frac{n!}{(n-r)!}$$

2.7 Students will find the number of permutations of things that are not all different (linear),

$$\frac{n!}{n_1!n_2! \ldots n_k!} \quad \text{where } n_1+n_2+\ldots+n_k = n.$$

*2.8 Students will find the number of combinations of n things taken r at a time,

$$_nC_r = \frac{n!}{r!(n-r)!}.$$

2.9 Students will find the number of ways in which specified subsets can be selected from two or more given sets.

3.0 Binomial Theorem

*3.1 Students will (1) simplify expressions and (2) solve equations containing the combination notation $\binom{n}{r}$, where $r \leq n$.

3.2 Students will determine the coefficients for expansions of given binomials.

*3.3 Students will find indicated terms for expansion of given binomials.

3.4 Students will write expansions for binomials raised to specified powers.

4.0 Probability

*4.1 Students will find the probability of events in given sample spaces.

*4.2 Students will find the probability of complementary events in given sample spaces.

*4.3 Students will find the probability of the union of events which are (1) mutually exclusive and (2) not mutually exclusive.

*4.4 Students will find the probability of independent events.

4.5 Students will find the conditional probability of independent events.

4.6 Students will find the probability of mutually exclusive events by applying Bayes' Theorem.

4.7 Students will (1) list the sample spaces and (2) assign probability to each sample space for given problems involving random drawing.

4.8 Students will describe the procedure for using random number tables to determine specified selections.

5.0 Organizing and Processing Data

*5.1 Students will construct (1) bar graphs, (2) picture graphs, and (3) line graphs when given statistical data.

5.2 Students will construct frequency tables when given appropriate data and guidelines.

*5.3 Students will estimate central tendencies of sets of data by finding the (1) mode, (2) median, and (3) mean.

*5.4 Students will determine standard deviations for given sets of data.

5.5 Students will find the variances for given sets of data.

5.6 To demonstrate knowledge of Chebyshev's Theorem, students will:

(1) determine the percentage of total probability within given intervals centered at the mean and

(2) determine the interval necessary to guarantee inclusion of specified percentage of random variables.

6.0 Binimial and Normal Distributions

6.1 Students will list the properties for a binomial (or Bernoulli) experiment.

6.2 Students will display possible outcomes of given experiments in the form of probability distribution tables.

6.3 Students will construct histograms for binomial distributions with specified values for the number of trials and probability.

*6.4 Students will find areas under the normal curve between specified intervals.

6.5 Students will find the probability for a standard normal random variable falling within a specified interval.

6.6 Given the mean and standard deviation of a normal distribution, students will find the standard normal distribution for given values.

6.7 Given the mean and standard deviation of test scores, students will interpret given test scores in terms of percentiles.

7.0 Inferential Statistics

7.1 Students will find the mean of the sample means in terms of the given population.

7.2 Students will express the standard deviation of the means of all possible samples of a specified size in terms of standard deviation of the original population.

7.3 Students will estimate (1) mean, (2) standard deviation, and (3) confidence intervals based on controlled sampling.

INTRODUCTION
TRIGONOMETRY

State Accreditator Number. . 2219
Course Code Number 1701
F.T.E. Category. 1.10
Instructional Level. . . . . Advanced

Report Card Abbreviation . . ADV TRIG
Length of Course . . . . . . Semester
Credit . . . . 1/2 Math Credit
Grade Level. 10, 11, 12

Prerequisites

A or B average in Algebra II and Math Teacher Recommendation

Textbook(s)

Wooten, William, et al, *Modern Trigonometry, Revised Edition*
(Atlanta: Houghton Mifflin, 1979.)

Notes to Teachers

Students will master the concepts and skills developed for Trigonometry as presented in the Performance Objectives and summarized in the Course Outline. Minimum Level Skills (MLS) objectives are indicated by asterisks (*). Only MLS objectives will be tested on the Minimum Level Skills Test (MLST).

TRIGONOMETRY

1.0 Circular Functions

- *1.1 Unit Circle
  - 1.1.1 Identify equation
  - 1.1.2 Determine coordinates of points
- *1.2 Define Sine/Cosine Functions
- 1.3 Define Tangent/Cotangent/Secant/Cosecant
- 1.4 Specify Domain/Range of Circular Functions
- *1.5 Determine Values For Integral Multiples of 0, $\frac{\pi}{6}$, $\frac{\pi}{4}$, $\frac{\pi}{3}$, and $\frac{\pi}{2}$.
- *1.6 Evaluate Circular Expressions
- *1.7 Determine Other Function Values Given One Value

2.0 Identities

- 2.1 Define Identity
- *2.2 Fundamental Identities
  - 2.2.1 Pythagorean
  - 2.2.2 Reciprocal
  - 2.2.3 Quotient (ratio)
- *2.3 Simplify Circular Expressions (Fundamental Identities)
- 2.4 Prove Identities Using Identities
  - 2.4.1 Pythagorean, reciprocal, and quotient (ratio)
  - 2.4.2 Sum and difference
  - 2.4.3 Half- and double-angle
- *2.5 Evaluate Circular Expressions Using Identities
- 2.6 Solve Equations Using Identities
  - *2.6.1 Pythagorean, reciprocal, and quotient (ratio)
  - 2.6.2 Sum and difference
  - 2.6.3 Half- and double-angle

3.0 Graphs of Circular Functions

- *3.1 Recognize Graphs of Circular Functions
- 3.2 Variations of Sine/Cosine Functions
  - *3.2.1 Identify amplitude
  - *3.2.2 Identify period
  - 3.2.3 Identify phase shift
  - 3.2.4 Sketch graphs
- 3.3 Variations of Tangent/Cotangent/Secant/. Cosecant Functions
  - 3.3.1 Identify asymptotes
  - 3.3.2 Identify period
  - 3.3.3 Sketch graphs

4.0 Trigonometric Functions

- *4.1 Define Directed Angle in Standard Position
- *4.2 Convert Between Radian and Degree Measure
- *4.3 Define Trigonometric Functions
- *4.4 Determine Function Values Given Coordinates
- *4.5 Determine Values For Integral Multiples: 0°/ 30° /45° / 60° / 90°
- *4.6 Trigonometric Tables
  - 4.6.1 Find function values
  - 4.6.2 Find angles

5.0 Triangles

- *5.1 Identify Six Trigonometric Ratios in Terms of Sides of Triangles
- *5.2 Solve Right Triangles
- *5.3 Solve Oblique Triangles
  - 5.3.1 Law of Cosines
  - 5.3.2 Law of Sines
- *5.4 Compute Area

*Indicates Minimum Level Skills

TRIGONOMETRY

- *5.5 Solve Problems
    - 5.5.1 Right triangles
    - 5.5.2 Oblique triangles

- 6.0 Inverses of Circular Functions
    - 6.1 Define Inverse Circular Functions
    - *6.2 Evaluate Expressions
    - 6.3 Solve Equations

- 7.0 Polar Coordinates
    - 7.1 Define Polar Coordinates
    - 7.2 Convert Between Rectangular/ Polar Coordinates
    - 7.3 Transform Equations
        - 7.3.1 Rectangular to polar
        - 7.3.2 Polar to rectangular
    - 7.4 Graph polar equations

- 8.0 Geometric Vectors
    - 8.1 Define Geometric Vectors/ Scalars
    - 8.2 Operations With Vectors
        - 8.2.1 Algebraic product of vector and scalar
        - 8.2.2 Geometric sum and difference
    - 8.3 Resolve into Components
    - 8.4 Solve Problems

PERFORMANCE OBJECTIVES
TRIGONOMETRY

Trigonometry is designed for students who have successfully completed courses in Geometry and Algebra II. The study of circular and trigonometric functions and their applications to mathematical problems, including the solutions of triangles, constitutes the subject matter of trigonometry. This advanced course continues the in-depth study of functions introduced in previous courses. Successful completion of this course is based on teacher judgement and the requirement that students pass the Minimum Level Skills Test.

Performance Objectives

1.0 Circular Functions

*1.1 Students will (1) identify the equation of the unit circle when given a list of equations and (2) determine whether given points lie on the unit circle.

*1.2 Students will identify the abscissa or ordinate of a point on the unit circle as the cosine or sine.

1.3 Students will define tangent, cotangent, secant, and cosecant in terms of sine and cosine.

1.4 Students will specify the domain and range of the six circular functions.

*1.5 Students will determine function values for radian measures in integral multiples of 0, $\frac{\pi}{6}$, $\frac{\pi}{4}$, $\frac{\pi}{3}$, and $\frac{\pi}{2}$.

*1.6 Students will evaluate expressions involving special values of circular functions.

*1.7 Given the value of one circular function, students will determine values for the other functions.

2.0 Identities

2.1 Students will define an identity as an equation that is true for all permissible values of the variable.

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*Indicates Minimum Level Skills

*2.2 Students will recognize (1) the Pythagorean identities, (2) the reciprocal identities, and (3) the quotient (ratio) identities.

*2.3 Students will simplify circular expressions involving Pythagorean, reciprocal, or quotient (ratio) identities.

2.4 Students will prove specified identities by applying (1) Pythagorean, reciprocal, and quotient (ratio) identities, (2) sum and difference, and (3) half-angle and double-angle identities.

*2.5 Students will evaluate expressions involving circular functions using sum, difference, half-angle and double-angle identities.

2.6 Students will solve equations involving:

*(1) Pythagorean, reciprocal, and quotient (ratio) identities;

(2) sum and difference identities; and

(3) half-angle and double-angle identities.

3.0 Graphs of Circular Functions

*3.1 Given appropriate sketches of the graphs of the six circular functions, students will recognize the functions graphed.

3.2 Students will:

*(1) identify the amplitude;

*(2) identify the fundamental period;

(3) identify the phase shift; and

(4) sketch the graph given equations in the form

$\{(x,y): y = A \sin(Bx+C), A,B,C \text{ real}\}$ and

$\{(x,y): y = A \cos(Bx+C), A,B,C \text{ real}\}$.

3.3 Students will (1) identify asymptotes, (2) identify fundamental periods, and (3) sketch graphs given equations in the form:

$\{(x,y): y = A \tan(Bx+C), A,B,C \text{ real}\}$;

$\{(x,y): y = A \cot(Bx+C), A,B,C \text{ real}\}$;

$\{(x,y): y = A \sec(Bx+C), A,B,C \text{ real}\}$; and

$\{(x,y): y = A \csc(Bx+C), A,B,C \text{ real}\}$.

4.0 Trigonometric Functions

*4.1 Students will recognize a directed angle in standard position when given appropriate sketches.

*4.2 Given the measure of an angle in degrees or radians, students will convert to the other unit of measure.

*4.3 Students will define the six trigonometric functions when given an arbitrary point (x,y) on a circle with radius r.

*4.4 Students will determine function values given the coordinates of a point other than the origin on the terminal side of an angle in standard position.

*4.5 Students will determine function values for angle measures in integral multiples of 0°, 30°, 45°, 60°, and 90°.

*4.6 Students will use trigonometric tables and linear interpolation when necessary to (1) find the values of trigonometric functions when given angles expressed to the nearest minute and (2) find the measures of angles to the nearest minute given values of trigonometric functions.

5.0 Triangles

*5.1 Students will identify the six trigonometric ratios in terms of sides of right triangles.

*5.2 Students will solve right triangles given appropriate parts.

*5.3 Students will solve oblique triangles using (1) the Law of Cosines and (2) the Law of Sines when given appropriate parts.

*5.4 Students will compute the area of triangles when given appropriate parts.

*5.5 Students will solve practical problems involving (1) right triangles and (2) oblique triangles.

6.0 Inverses of Circular Functions

6.1 Given a circular function and its graph, students will define the inverse of that function as a relation and as a function.

*6.2 Students will evaluate expressions involving inverse circular functions.

6.3 Students will solve equations involving inverse circular functions.

7.0 Polar Coordinates

7.1 Students will define polar coordinates as ordered pairs involving radius vectors and the measures of angles.

7.2 Students will convert given rectangular coordinates to polar coordinates and given polar coordinates to rectangular coordinates.

7.3 Students will transform (1) rectangular equations to polar form and (2) polar equations to rectangular form.

7.4 Students will graph polar equations.

8.0 Geometric Vectors

8.1 Students will define geometric vectors and scalars.

8.2 Students will (1) find the algebraic product of a vector and a scalar and (2) find the geometric sum and difference of vectors.

8.3 Students will resolve geometric vectors into horizontal and vertical components.

8.4 Students will use geometric vectors to solve practical problems.